| Robotics Domain Task Force Final Agenda ver.1.0.2 | | | | | | robotics/2007-09-01 |
|---|---|---|---|---|---|---|
| OMG Technical Meeting - **Jacksonville, FL, USA** -- Sep. 24-28 , 2007 | | | | | | |
| | | **TF/SIG** | | http://robotics.omg.org/ | | |
| | | **Host** | **Joint (Invited)** | **Agenda Item** | **Purpose** | **Room** |
| **Monday WG activity** | | | | | | |
| 9:00 | 10:00 | Robotics | | Robotics Steering Committee<br>- all volunteers | Arrangement | City Terrace 11, 3rd FL |
| 10:00 | 12:00 | Robotics | | Services WG(2h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | City Terrace 11, 3rd FL |
| 12:00 | 13:00 | | | **LUNCH** | | River Terrace 1, 3rd FL |
| 13:00 | 18:00 | | | Architecture Board Plenary | | City Terrace 9, 3rd FL |
| 13:00 | 17:00 | Robotics | | Services WG(4h): Robotic Localiza ion Services Meeting<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | City Terrace 10, 3rd FL |
| **Tuesday WG activities** | | | | | | |
| 10:00 | 12:00 | Robotics | | Services WG(3h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | City Terrace 11, 3rd FL |
| 12:00 | 13:00 | | | **LUNCH** | | River Terrace 1, 3rd FL |
| 13:00 | 17:00 | Robotics | | Services WG(4h): Robotic Localiza ion Services Meeting<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | City Terrace 11, 3rd FL |
| **Wednesday Robotics Plenary** | | | | | | |
| 9:00 | 10:00 | Robotics | | WG Reports and Roadmap Discussion<br>(Service WG) | reporting and discussion | City Terrace 5, 3rd FL |
| 10:00 | 11:00 | Robotics | | Contact Reports:<br>- Makoto Mizukawa(Shibaura-IT), and Yun-Koo Chung(ETRI) | presentation and discussion | |
| 11:00 | 11:30 | Robotics | | Publicity SC Report, Next meeting Agenda Discussion | presentation and discussion | |
| 11:30 | | | | Adjourn joint plenary mee ing | | |
| 11:30 | 12:00 | Robotics | | Robotics WG Co-chairs Planning Session<br>(Agenda for Burlingame, Draft report for Friday` | planning for next meeting | City Terrace 5, 3rd FL |
| 12:00 | 14:00 | | | **LUNCH and OMG Plenary** | | River Terrace 1, 3rd FL |
| | | | | | | |
| 18:00 | 20:00 | | | **OMG Reception** | | River Terrace 1, 3rd FL |
| **Thursday** | | | | | | |
| 12:00 | 13:00 | | | **LUNCH** | | River Terrace 1, 3rd FL |
| 13:00 | 18:00 | | | Architecture Board Plenary | | City Terrace 9, 3rd FL |
| **Friday** | | | | | | |
| 8:30 | 12:00 | | | AB, DTC, PTC | | River Terrace 1, 3rd FL |
| 12:00 | 13:00 | | | **LUNCH** | | River Terrace 2, 3rd FL |
| **Other Meetings of Interest** | | | | | | |
| **Monday** | | | | | | |
| 8:00 | 8:45 | OMG | | New Attendee Orienta ion | | Daytona, 3rd FL |
| 9:00 | 12:00 | OMG | | Tutorial - Introduction to OMG's Modeling and Middleware Specifications | | Suite 4104, 4th FL |
| 15:00 | 18:00 | RTESS | | RTESS - Universal Data Element Framework (UDEF) Overview and Tutorial | | City Terrace 4, 3rd FL |
| 18:00 | 19:00 | OMG | | New Attendee Reception (by invitation only) | | Suite 4104, 4th FL |
| **Tuesday** | | | | | | |
| 9:00 | 12:00 | OMG | | Tutorial - Introduction to OMG's Modeling and Middleware Specifications | | Suite 4104, 4th FL |
| 9:00 | 17:00 | OMG | | Precise Behavioral Seman ics for Domain Specific Modeling Languages | | St. Johns, 3rd FL |
| **Thursday** | | | | | | |
| 17:00 | 18:00 | MARS | | Agenda Coordination Meeting for Burlingame | planning for next | City Terrace 6, 3rd FL |

Please get the up-to-date version from http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

Minutes Draft of the Robotics-DTF / SDO-DSIG Joint Meeting
June 24-29, 2007, Brussels, Belgium
robotics/2007-06-27

## Minutes Highlights

- Robotics Information Day (Monday, PM, 6 Talks + Panel Discussion, 40 participants)
  - RoSta: A comparative evaluation of robotic software systems: A case study (MSc. Azamat Shakhimardanov, Erwin Prassler, RoSTA)
  - Why Do We Need Standardization of Robot Technology? (Masayoshi Yokomachi, NEDO, Japan)
  - OpenRTM-aist: A reference Implementation of the Robotic Technology Component Specification (Tetsuo KOTOKU, AIST, Japan)
  - Robotics DTF and Robotic Technology Component (Rick Warren, RTI)
  - Korean Thrust for Intelligent Service Robot Standards (Sukhan Lee)
  - Implementation and Application of URC and its standardization (Hyun Kim, ETRI)

- Robotics/SDO Joint Plenary: (29 participants)
  - 2 WG Reports [Service WG, Profile WG ]
  - 2 Interesting Talks
    - CANopen introduction (Holger Zeltwanger, CiA)
    - Anybot studio - Samsung Network Robot SW Platform (Hyun-Sik Shim, SoonHyuk Hong, Samsung)

.

## Brussels Meeting 2007 6/24-29 Quarum：5

List of Generated documents

robotics/2007-06-01 Localization Service DRAFT RFP (*Kyuseo Han)*
robotics/2007-06-02 Final Agenda (Tetsuo Kotoku)
robotics/2007-06-03 San Diego Meeting Minutes [approved]
robotics/2007-06-04 Revised Localization Service DRAFT RFP (*Kyuseo Han)*
robotics/2007-06-05 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2007-06-06 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2007-06-07 Robotics Seminar: Why Do We Need Standardization of Robot Technology? (Masayoshi Yokomachi)
robotics/2007-06-08 Robotics Seminar Keynote: A Comparative Evaluation of Robotic Software Systems: A Case Study (Azamat Shakhimardanov and Erwin Prassler)
robotics/2007-06-09 Robotics Seminar: Introduction to the Robotics Domain Task Force and the Robotic Technology Component (RTC) Specification (Rick Warren)
robotics/2007-06-10 Robotics Seminar: OpenRTM-aist A reference Implementation of the Robotic Technology Component Specification (Tetsuo Kotoku)
robotics/2007-06-11 Robotics Seminar: Keynote: Korean Thrust for Intelligent Service Robot Standards (Sukhan Lee)
robotics/2007-06-12 Robotics Seminar: Implementation and application of URC and its Standardization (Hyun Kim)
robotics/2007-06-13 Robotic Localization Service RFP [C4I joint session and ManTIS joint session presentation] (Kyuseo Han)
robotics/2007-06-14 Face Recognition Service Component API for Intelligent Robots (Su-Young Chi)
robotics/2007-06-15 Localization Service DRAFT RFP 3rd revision (Kyuseo Han and Shunichi Nishio)

robotics/2007-06-16 Robotic Functional Services WG Meeting Report (Su-Young Chi)
robotics/2007-06-17 Robotic Data Structure and Profiles WG Progress Report (Seung-Ik Lee)
robotics/2007-06-18 Special Talk: Introduction to CANopen (Holger Zeltwanger)
robotics/2007-06-19 Special Talk: Anybot studio - Samsung Network Robot SW Platform (Hyun-Sik Shim and Soon-Hyuk Hong)
robotics/2007-06-20 Contact report: ISO/TC184/SC2 Report (Yun-Koo Chung)
robotics/2007-06-21 Contact report: KRISF Report (Yun-Koo Chung)
robotics/2007-06-22 Contact Report: ORiN and RAPI (Makoto Mizukawa)
robotics/2007-06-23 Closing Presentation (Tetsuo Kotoku)
robotics/2007-06-24 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2007-06-25 Localization Service DRAFT RFP final revision (Kyuseo Han and Shunichi Nishio)
robotics/2007-06-26 DTC Report Presentation (Yun-Koo Chung)
robotics/2007-06-27 Brussels Meeting Minutes - DRAFT (Fumio Ozaki and Yun-Koo Chung)

## MINUTES of Robotics DTF Plenary Meeting

June 25th, 2007, Monday, Klimt room

10:00-10:15 plenary opening

. Sandiego meeting minutes were reviewed and approved.
(Motion: Kotoku(AIST), Yun Koo Chung(ETRI),
Makoto Mizukawa(Shibaura I.T.),. .

. Minute takers for the Brussels meeting:
Fumio Ozaki(Toshiba), Yun Koo Chung(ETRI)

13:00-18:00 Robotics Semina (6 Talks and Panel Discussion)

- Opening Address: Richard Soley, OMG Chair

- RoSta: A comparative evaluation of robotic software systems: A case study (MSc. Azamat Shakhimardanov, Erwin Prassler, RoSTA.

A case study of a comparative evaluation of robotic software system in RoSta(Robot Standards and Reference Architectures) was introduced by professor A. Shakhimardanov. RoSta has been funded by EU. Vision of RoSta is to take the initiative on the definition of formal standards and the establishment of “de facto” standards in the field of robotics, especially service robotics. RoSta has four topics: First, Glossary/ontology for mobile manipulation, service robots. Second, Specification of a reference architecture. Third, Specification of a middleware. Fourth, formulation of benchmarks for establishing standards in robotics. Currently, RoSta is executing many projects. Especially, this semina introduced benchmarking and evaluation method as one of RoSta activities.

- Why Do We Need Standardization of Robot Technology? (Masayoshi Yokomachi, NEDO, Japan)

Standardization activity in Japan was introduced. Japan’s R&D schemes with industry, government, academy and research institutes in the robot field was explained. Japan experts forcasted the robot industry market as US$ 9 Billion in 2005, US$ 22 Billion in 2010 and US$ 76 Billion in 2025. RTC is mentioned as current OMG standard with needs of utilizing the standard for expansion of industry. In future, components are to be standardized as a next step.

- OpenRTM-aist: A reference Implementation of the Robotic Technology

Component Specification (Tetsuo KOTOKU, AIST, Japan)

RTC was adopted as OMG standard in the last year. Now The RTC has been implemented and the work is almost done. RT middleware is middleware and platform for RT-element integration. RT component is a basic software unit in RT-Middleware. AIST will release the OpenRTM-aist-1.0.0: which is compliant to formal RTC Specification in 4th quarter, 2007. Currently the OpenRTM-aist-0.4.0 (latest version) can be seen as RPM package (for development, FedoraCore4, FedoraCore5, FedoraCore6, VineLinux3.2, VineLinux4.0) and Vmwarepackage (for tutorial) and based on CORBA PSM(omniORB). The reference is "**http://www.is.aist.go.jp/rt/OpenRTM-aist/".** In Japan, RT middleware (RTC model) is adopted as a framework of new projects.

- Robotics DTF and Robotic Technology Component (Rick Warren, RTI)

RTI has been growing up with interests and a lot of activities in DDS, CORBA, JAUS, and STANAG. RTI has contributed in drafting RTC OMG specification with AIST. Robotic Technology Component (RTC) Specification is the First robotics-specific effort at OMG and Component model for robotics. It will be basis for software modularization and integration at infrastructure/ middleware level in this domain. RTC concept is shown and explained using example of localization service component.

- Korean Thrust for Intelligent Service Robot Standards (Sukhan Lee)

Korean Standards activity is introduced utilizing the Korean Intelligent Robot Standard Forum(KIRSF), Korea has a very good standardization organization and its activity is very active. Several good standard organization are needed to speed up robot standards and activate the robot industries worldwide. Korea is doing and opening the URC concepts which is based on server/client based network robot. They are trying to standardize the URC concept in OMG. URC concept is being implemented through the URC robot pilot business.

- Implementation and Application of URC and its standardization (Hyun Kim, ETRI)

URC concept is introduced by Hyun Kim who is the one of leading URC project managers. Concept of architecture of URC framework is explained with system configuration. The implementation results from 2004, 2005 and 2006 are introduced. The ETRI role and industry roles are shown in implementation and applications. The survey regarding the URC service and satisfaction was conveyed. Those defects and customers requirements will be reflected into the development of URC technology and products. Also, the standardization of URC is introduced with RUPI ver 1.0 regarding RUPI (Robot unified platform initiative), Planet AND SAM Service agent manager. 30 companies participate in URC business.

- Panel discussion: What topics are most important in standardization of service robots? ( 5 experts)

- RTC is important as the base of component model. RTC is a conceptual model, but also it needs to deliver engineering hardware component.
- Human robot interaction is important standardization area. We need to meet together and extract the right subject for the standardization.
- The most important area is the communication protocol in the point of user view. The message format between robot and a user should be handled.

- After RTC, we need to make a lot of components.
- Dr. Doi:
  - o NRF: There are many standards already, so bridging between standadizations are most important.
- Dr. Cho
  - o I/F is very important.
  - o All standardization should be based on the I/f
  - o Before sevice standardiation, we need to standadization for I/F.
  - o In Korea, URC is doing so.
    - How to make the business model is most interested in Korea.
  - o Standard communication framework and middleware, and API are important.

- Dr. Yokomachi
  - o Open, Universal and autonomous.
    - + software infrastructure
    - + robot modularization devices
    - + parallel distributed processing is necessary.
  - o Basic PJ
    - + RTmiddleware
    - + Image, Voice, and Motion

June 27th, 2007, Wednesday, Klimt room

09:00-10:00 plenary opening

- ■ WG reports
- ● Robotic Devices & Data Profile WG Progress Report (Seung-Ik Lee)
  - – The RFP topic is decided to be separated as following:
    . Programmer's view on device: device abstraction APIs
    . Transducer's view
  - – More candidate submitters was are seriously needed.

- ● Robotics functional services WG
  - – Change of Service WG Cochair
    . Olivier Lemaire(AIST) quits because of job change
    . New volunteer for cochair of service WG is Shuichi Nishio (ATR)
    1st motion: Kotoku(AIST), 2nd motion: Mizukawa (SIT)
    White ballot: Chung(ETRI). Motion passed unanimously.
  - – Meeting: Sunday, Monday, Tuesday and Thursday
  - – 2nd RFP for robotic localization service was approved to be recommended to AB and DTC after comments from AB was reflected.
  - – Joint Sessions for comments and cooperation were held with C4I and ManTIS.
  - – Roadmap of Localization service:
    . RFP issue – June 2007 Brussels meeting,
    . 1st submission and review – Dec. 2007 Burlingame meeting
    . Revised submission and review – June 2008 Ottawa meeting
  - – Discussion of new item for RFP:
    . Many discussion for new item was discussed.

- ■ Special talks
- ● **Introduction into CANopen communication technology (Zeltwanger (CiA))**

- Service data object(SDO) protocols, Process data object(PDO) protocol
- PDO scheduling modes
- Synchronous operations
- PDO mapping
- Device profile approach
- CANopen Examples:
  . Factory automation,
  . Extruder downstream devices,
  . Virtual door devices:

- **Anybot studio - Samsung Network Robot SW Platform – (Hyun Sik Shim & SoonHyuk Hong (Samsung)**
  - Anybot studio is a SW development tool for Samsung URC based Samsung network robot.
  - Anybot components of Anybot studio was explained with implementation Video clips.
  - AnyRobot Simulator
    . Tools for testing real robot program w/o real robot platform
    . video clip
  - AnyMap Studio : Robot environment modeling
  - Various environment viewer
  - Demo1 : fairy tale using B1
  - Demo 2: Face recognition / face tracking, TTS, user identification, following,
  - Demo 3: AnyRobot URC Home service demo
  - Demo 4: Sobot in cellular phone using AnyAction Studio
  - Demo 5: Cloning Sobot & Robot: Recognize touch, object,
    Playing in celluarphone & on real robots

  - 2007.4Q, AnyRobot studio will be available.

■ Contact Reports

- Contact report by Yun Koo Chung, ETRI
  - Korean Standardization Activities
  - Statistics of Korean Standards in IT and Communications

- ISO Contract report by Yun Koo Chung(ETRI) and Kuyeong Oh(TTA)
  - Washington DC Meeting (2007.6.4~8, Gaithersburg, NIST)
  - Participants: 14 experts (Korea, Japan, UK, France, Sweden, US)
  - Meetings: AG1(Service Robot) & PT2(Personal Care Robot)
  - Safety Issue for Personal Care Robot in PT2
  - Vocabulary definition newly starts in PT3
  - OMG Liaison to ISO/TC184/SC2 is recommended to Yun Koo Chung(ETRI)

- RAPI by Makoto Mizukawa(Shibaura-IT)
  - RAPI was failed to be adopted in ISO/TC184/SC2
  - 6 yes, 3 no, 2 abstentions, 7 no votes
  - It will be discussed in ISO/TC184/SC5
  - ICCAS conference: Robotic Standardization workshop will be held on October 2007 at Seoul, Korea.

- Publicity report by Masayoshi Yokomachi (NEDO)
  - A flier will be ready to next meeting.

- Next meeting Agenda discussed by Kotoku (AIST)
  - Service WG volunteers
    Lemaire-san to Nishio-san (ATR) is approved.
    . Kotoku-san motion, Abheek 2nd, Mizukawa-sensei white ballot
  - Infrastructure WG Rick is going to quit the volunteer.

Adjourned joint plenary meeting at 18:00

Attendees: 29

| | |
|---|---|
| Kwang-Hyun Park | KAIST |
| YeongHoon Cho | KAIRA |
| Toshi Kuroku | CSK Holdig |
| Tetsuo Kotoku | AIST |
| Makoto Mizukawa | S.I.T. |
| Rick Warren | RTI |
| Ozaki Fumio | Toshiba |
| Masayoshi Yokomachi | NEDO |
| Takeshi Suehiro | AIST |
| Yun Koo Chung | ETRI |
| Seung-In Lee | ETRI |
| Takeshi Sakamoto | Technologic Arts |
| Toshio Hori | AIST |
| Miwako Doi | Toshiba |
| Suyoung Chi | ETRI |
| Takashi Tsubouchi | U. of Tsukuba |
| Tomoki Yamashita | Mayekawa MFG |
| HyunSik Shim | Samsung |
| SeokWon Bang | Samsung |
| Kyuseo Han | ETRI |
| Itsuki Noda | AIST |
| Shuichi Nishio | ATR |
| Darren Kellz | NoMagic Inc |
| Sim-Suk Lee | TTA |
| Kuyeong Oh | TTA |
| Yeonho Kim | Samsung |
| JiHoon Kang | Samsung |
| Young-Jo Cho | ETRI |
| Noriaki Ando | AIST |

Prepared and submitted by Ozaki Fumio (Toshiba) and Yun Koo Chung (ETRI)

# Robotics Domain Task Force Steering Committee Meeting

September 24, 2007

## Jacksonville, FL, USA

Hyatt Regency Jacksonville Riverfront





# Brussels Meeting Summary

- **Localization Service for Robotics RFP issued**
- **Robotics-DTF Seminar: (34 participants+)**
- **Robotics/SDO Joint Plenary: (25 participants)**
  - **2 WG Reports**
  - **2 Interesting Talks**
    - Introduction to CANopen (Holger Zeltwanger, CiA)
    - Anybot studio - Samsung Network Robot SW Platform (Hyun-Sik, Samsung)
- **Joint meeting with C4I: (Tue.)**
- **Joint Meeting with ManTIS: (Thu.)**

# Agenda

- Agenda Review
- Minutes and Minutes Taker
- Publicity
- Roadmap Discussion
- Next meeting Schedule





# Agenda Review

**Mon(Sept. 24):**

**Steering Committee,**

**Services WG, RLS Meeting (single session)**

**RTC FTF Report (14:00)**

**Tue(Sept. 25):**

**Services WG, RLS Meeting, Cancel Profile WG**

**Wed(Sept. 26):**

**Task Force Plenary**

please check our final agenda

# Minutes and Minutes Taker

- Process:
  - Make a draft with in 5days
  - Send the initial draft to robotics-chairs@omg.org
  - Post the draft to the OMG server within a week
  - Make an announcement to robotics@omg.org
  - Send comments to robotics@omg.org
  - Approve the revised minutes at the Next meeting

- Volunteers for this Meeting
  - Shuichi Nishio
  - Su-young Chi

**We have to post our meeting minutes within a week!**



AIST

# Publicity Activities

- Robotics Wiki is available
  http://portals.omg.org/robotics

- Robotics-DTF fly sheet

Our fly sheet will be authorized

NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

# Roadmap Discussion

- Confirm the process of working items
- Create new items
  ( we need volunteers)





# Changes in volunteers

## Resignation

- Hung Pham (RTI) [ job change ]
- Seung-Ik Lee(ETRI) [ team policy change ]

## New Volunteer

- Robotic Localization Services WG
  - Kyuseo Han (ETRI)
  - Yeon-Ho Kim (Samsung)
  - Shuichi Nishio (JARA/ATR)
- Robotic Functional Services WG
  - Hyunsoo Kim (Samsung)

# Organization

OMG
OBJECT MANAGEMENT GROUP

**Robotics-DTF**
- Yun-Koo Chung (ETRI, Korea)
- Tetsuo Kotoku (AIST, Japan)

**Steering Committee** — All volunteers

**Publicity Sub-Committee**
- Abheek Bose (ADA Software, Indea)
- Masayoshi Yokomachi (NEDO, Japan)
- Yun-Koo Chung (ETRI, Korea)

**Contacts Sub-Committee**
- Makoto Mizukawa (Shibaura-IT, Japan)
- Yun-Koo Chung (ETRI, Korea)

***Technical WGs***

**Infrastructure WG**
- Noriaki Ando（AIST, Japan)
- Rick Warren (RTI, USA)
- Saehwa Kim（SNU, Korea)

**Robotic Functional Services WG**
- Soo-Young Chi (ETRI, Korea)
- Shuichi Nishio (JARA/ATR, Japan)
- Hyunsoo Kim (Samsung, Korea)

**Robotic Data and Profiles WG**
- Bruce Boyes (Systronix, USA)

**Robotic Localization Services WG**
- Kyuseo Han (ETRI, Korea)
- Yeon-Ho Kim (Samsung, Korea)
- Shuichi Nishio (JARA/ATR, Japan)





# Next Meeting Agenda

December 10-14 (Burlingame, CA, USA)

**Monday:**

**Steering Committee (morning)**
RLS Initial Submission Presentations (am)
**WG activity** [Parallel WG Session] (pm)

**Tuesday:**

**WG activity** [Parallel WG Session] (am)
**Robotics-DTF Plenary Meeting** (pm)
- Guest and Member Presentation
- Contact reports

**Wednesday:**

**WG activity follow-up** [if necessary]

# Roadmap for Robotics Activities

robotics/2007-09-04

| Item | Status | Brussels Jun-2007 | Jacksonville Sep-2007 | Burlingame Dec-2007 | Washington DC Mar-2008 | Ottawa Jun-2008 | Orlando Sep-2008 | Santa Clara Dec-2008 | TBD Mar-2009 | POC / Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| **RTC Finalization Task Force** | In Process | Comment Due 7/2 | Report | Report Deadline 10/5 | | | | | | Noriaki(AIST) and Rick(RTI) |
| **Flyer of Robotics-DTF [Publicity Sub-Committee]** | In Process | | issue ver.1.0 | | | | | | | Abheek(ADA Software) |
| **Robotic Localization Service RFP [Robotic Functional Services WG]** | In Process | issue RFP | | Initial Submittion | Pre-review | Revised Submittion | | | | Shuichi Nishio (JARA/ATR)<br>Kyuseo Han (ETRI)<br>Yeon-Ho Kim (Samsung) |
| **Human Robot Interaction RFP [Robotic Functional Services WG]** | In Process | discussion | discussion | discussion | 1st Draft | 1st review RFP | RFP | | Initial Submittion | Su-Young Chi (ETRI) |
| **Hardware-level Resources: define resource profiles RFP [Profile WG]** | In Process | | | discussion | 1st review RFP | RFP | | Initial Submittion | Pre-review | Bruce Boyes (Systronix) |
| **Programmers API: Typical device abstract interfaces and hierarchies RFP [Profile WG]** | CANCELED | discussion | 1st review RFP | RFP | | Initial Submittion | Pre-review | Revised Submittion | | Seung-Ik Lee(ETRI) |
| etc… | Future | | | | | | | | | to be discussed |
| **Robotics Information Day [Technology Showcase]** | Planned | Seminar | | | | Seminar | | | | Yokomachi(NEDO),<br>Kotoku(AIST) |
| SDO Revision Task Force | done Sep-2006 | Report | | | | | | | | Sameshima(Hitachi) |
| Robot Technology Components RFP (SDO model for robotics domain) | done Sep-2006 | | | | | | | | | Rick(RTI) and Noriaki(AIST) |
| Robotic Systems RFI [Robotics: Initial Survey] | done Apr-2006 | | | | | | | | | Lemaire, Chung, Lee, Mizukawa, Kotoku |
| Charter on WGs [Service, Profile, Infrastructure] | done Apr-2006 | | | | | | | | | Lemaire(JARA), Chi(ETRI), Bruce(Systronix), Lee(ETRI), Rick(RTI), Ando(AIST) |
| Charter on Robotics TF | done Dec-2005 | | | | | | | | | Kotoku(AIST), |
| Charter on Robotics SIG | done Feb-2005 | | | | | | | | | Kotoku(AIST),<br>Mizukawa(Shibaura-IT) |

*IT R&D Global Leader*

# Introduction to HriAPI RFP

2007. 09. 24.

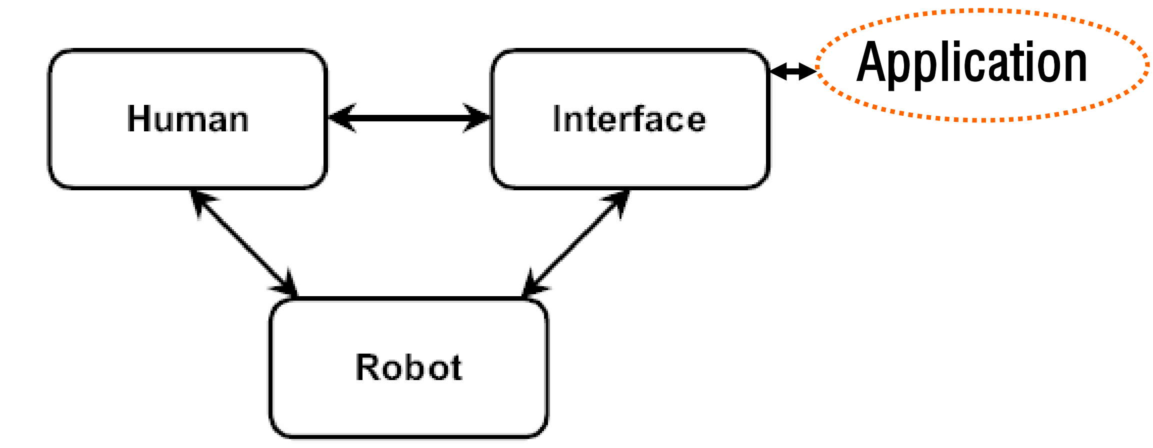
Functional Service WG
Dr. Suyoung Chi

ETRI
Electronics and Telecommunications Research Institute

## Contents

- Why need to standardize HriAPI
- A definition of HRI
- Scope of a successful proposal for HriAPI
- Mandatory requirements
- Issues to be discussed

## Implementation structure of a HriAPI component



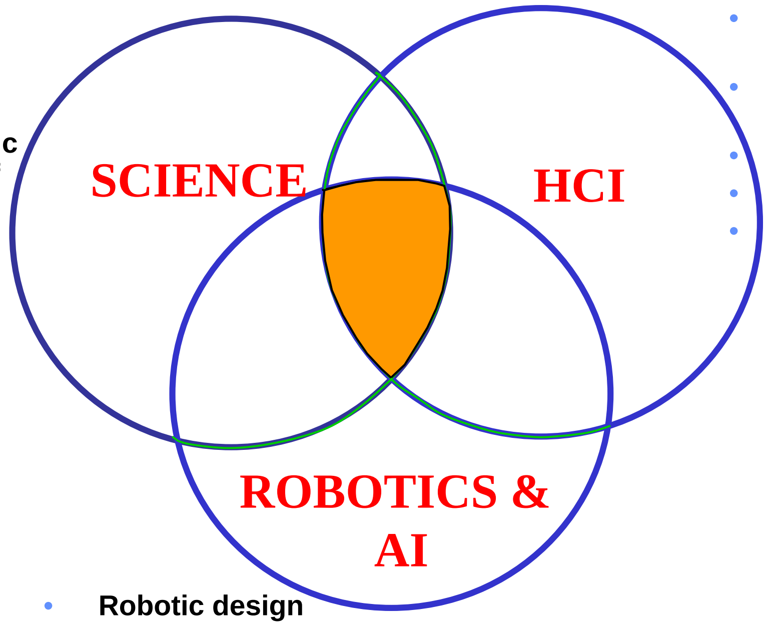

Human-robot interaction must be considered from multiple perspectives





## Need a multi-disciplinary community!

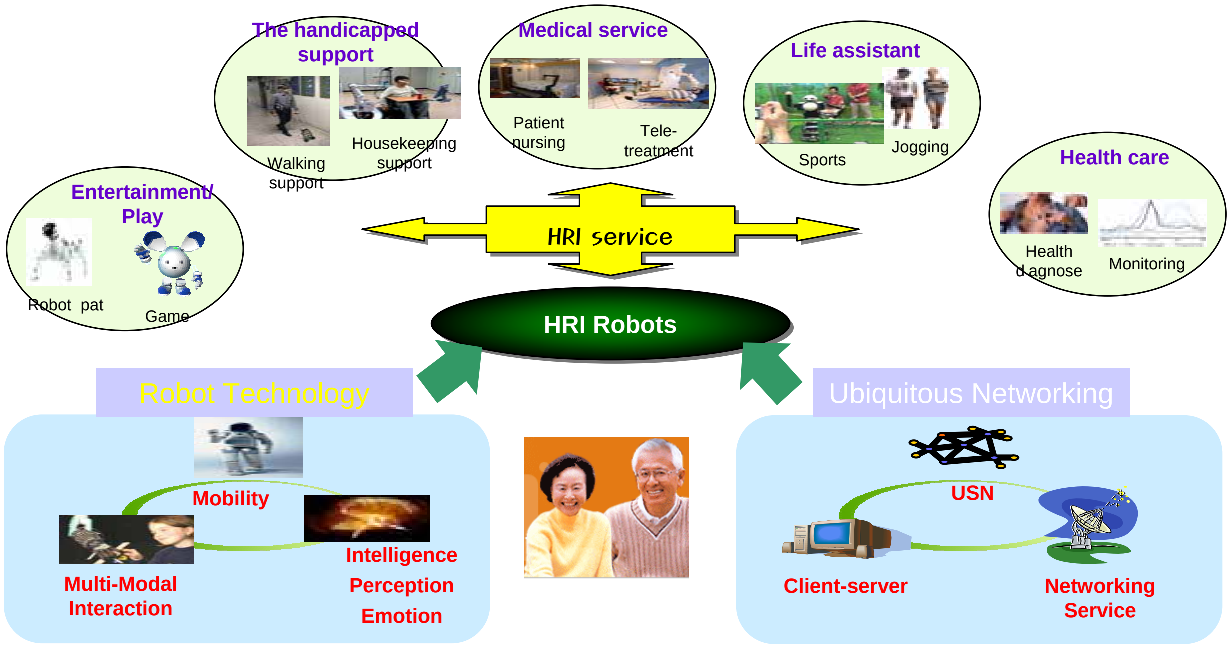
- Guide design of robot
- Understand human side
- Advance scientific understanding of both




- Human-centered design
- Measurements and Evaluation
- Usability
- Teach-ability
- Variation with gender, age, culture, etc.

- Robotic design
- Real-world autonomy
- Task performance
- Perception, Decision making, Knowledge, Learning, Emotion, Personality, etc.

# Ecosystem of HRI technology






Why need to standardize HriAPI

## ❑A HriAPI is needed

- To handle inherent complexity and heterogeneity of target environments and applications
- To embody interoperability and reusability for different H/W and S/W platforms
- Therefore, to ease development cost and achieve wide applicability to various tasks based on HRI information

# A definition of HRI

## Human-Robot Interaction

- A sub-field (super-field?) of Robotics, focused on understanding how people react to robots and how to improve their experience. HRI uses results from many fields, including Psychology, Computer Science, Cognitive Science, Communication, Robotics, Machine Learning, and others.
  - http://www.hriweb.org



# A definition of HRI

## Human-Robot Interaction

- Human-robot interaction (HRI) is the study of interactions between people (users) and robots. HRI is multidisciplinary with contributions from the fields of human-computer interaction, artificial intelligence, robotics, natural language understanding, and social science (psychology, cognitive science, anthropology, and human factors).
  - http://en.wikipedia.org/wiki/Human_robot_interaction

# A definition of HRI

## Human-Robot Interaction

- Robots are, or soon will be, used in such critical domains as search and rescue, military battle, mine and bomb detection, scientific exploration, law enforcement, entertainment, and hospital care. Such robots must coordinate their behaviors with the requirements and expectations of human team members; they are more than mere tools but rather quasi-team members whose tasks have to be integrated with those of humans.
- The basic goal of HRI is to develop principles and algorithms to allow more natural and effective communication and interaction between humans and robots.
  - http://en.wikipedia.org/wiki/Human_robot_interaction



# Scope of a successful draft RFP for HriAPI

## A HriAPI component should...

✓Simple application interfaces

✓Standard modular access to human robot interaction functions, algorithms, and devices

✓Secured and robust HRI data management and storage

✓Standard methods of differentiating HRI data and device types

✓Support for HRI identification in distributed computing environments

# Scope of a successful draft RFP for HriAPI

- This RFP Draft seeks proposals that specify a HRI service, on top of which various robotic applications are developed.
- It is necessary to consider the followings in the specification of the HRI service.
  - The HriAPI specification must be general enough to incorporate various HRI sensors and algorithms.
  - The HriAPI specification should provide the data representation for its external application interface as well as its internal functionalities.
    - The data representation may include basic elements for specifying identification, recognition and interaction activities



# Scope of a successful draft RFP for HriAPI

- The HriAPI specification should satisfy interoperability and reusability, such by providing common interfaces and common data formats. A HriAPI implemented by one vendor should be able to be replaced with HriAPIs provided by other vendors with little efforts.
- The HriAPI specification should provide a minimum set of functionalities to satisfy the following:
  - Providing an interface for accepting requests and for publishing HRI results.
  - Providing means for initialization of the HriAPI and for adjustment of the HRI result.

# Mandatory requirements

- Provide PIM and at least one PSM of HriAPI
  - **Specify common interfaces for HriAPI device(sensor) interfaces**
  - **Specify sensor data formats as well as map data formats for coherent location calculation**



# Issues to be discussed

❑A draft RFP shall

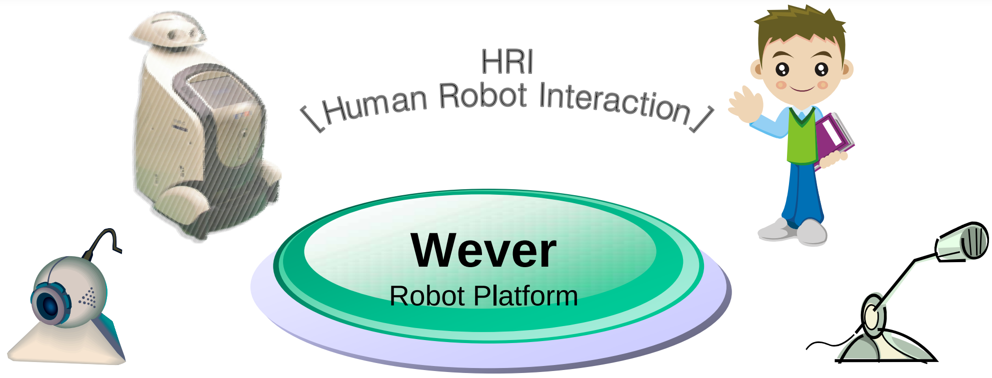
- Demonstrate its feasibility by using a specific application based on the proposed HriAPI
- Discuss simplicity of implementation and extension to other fields of interesting
- Discuss how the proposed HriAPI works seamlessly with RTC specification

- Review and discussion of the RFP draft
- We need to complete
  - Relationship to existing OMG specifications
  - Related activities, documents and standards



# HriAPI Components in ETRI

# HriAPI Components in ETRI




**Vision-based Components**

- Face recognition/verification
- Semi-Biometrics for user identification
- Gesture recognition
- Caller detection
- Human following
- Behavior analyzer

**Speech-based Components**

- Text-independent speaker recognition/verification
- Speech recognition
- Sound Localization
- TTS (Text To Speech)



# Application of HriAPI Components

**Recognition of the intension and request of the elderly**

- *Speech recognition*
- *Gesture recognition*
- *Caller Identification*

**Customized service for the each individual**

- *Face recognition*
- *Speaker recognition*
- *Semi-biometrics*

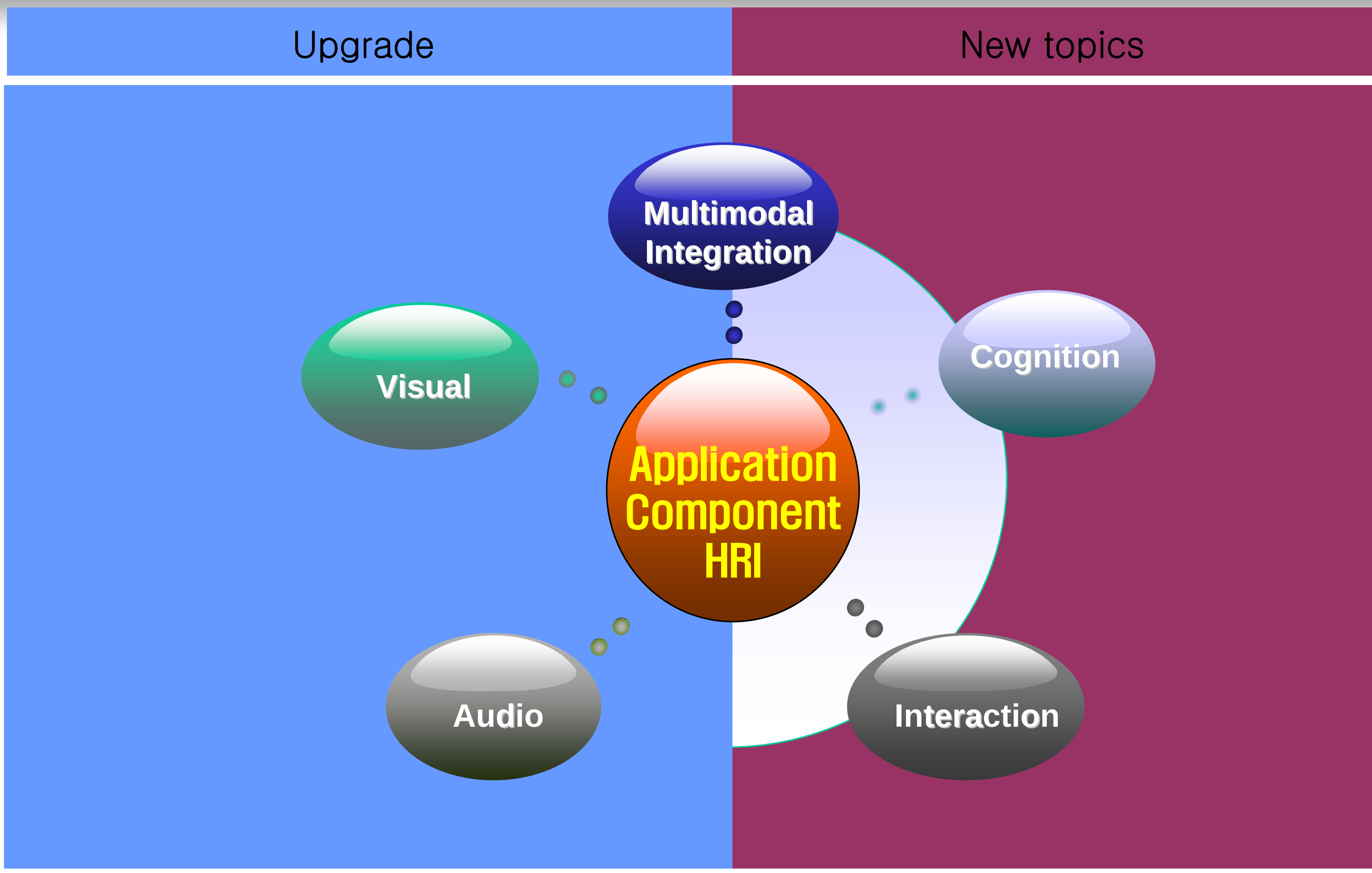
**Humanlike service & harmonious interaction with the elderly**

- *Expression recognition*
- *Cognition technology*
- *Multimodal interaction*

**Environment observation**

- *Sound localization*
- *Motion analysis*
- *Human following*

# HriAPI Components






# Thank You !

robotics/2007-09-06

# A QUICK VIEW OF ROBOTIC LOCALIZATION SERVICE PROPOSAL

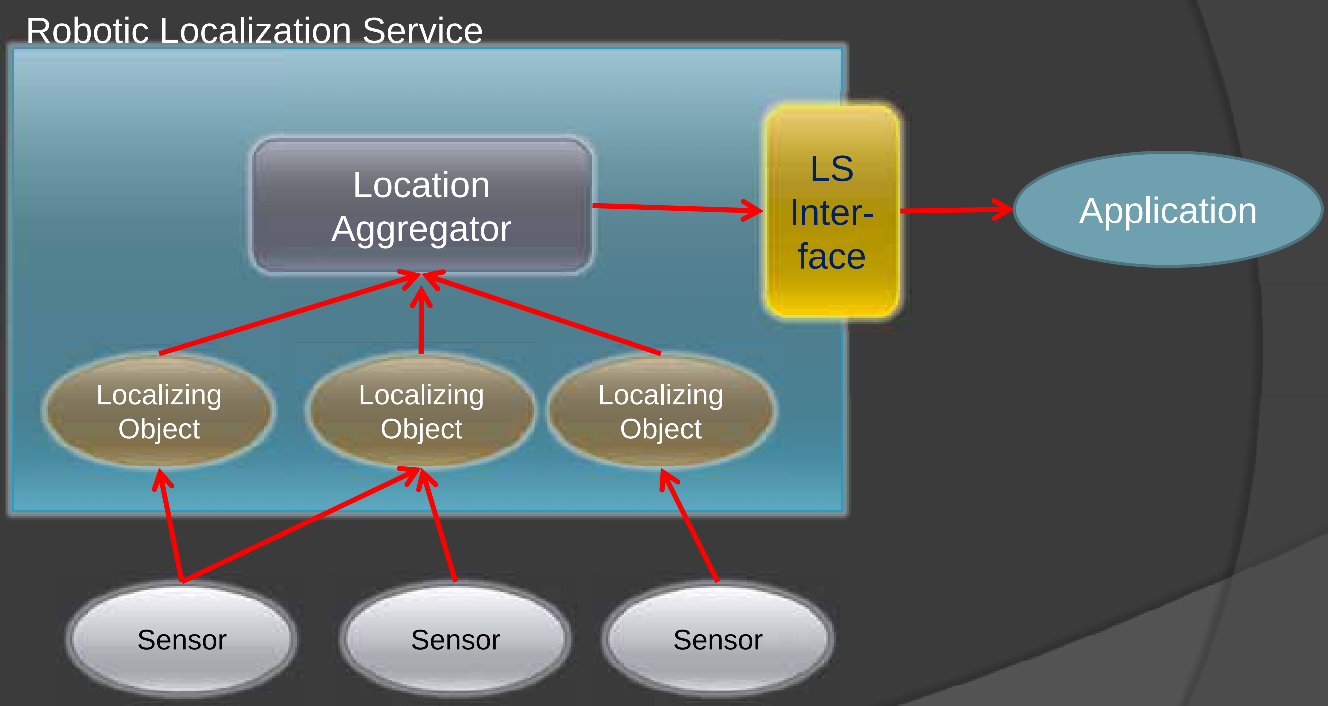
2007-09-24
Intelligent Robot Research Division
Electronics and Telecommunications Research Institute
Kyuseo Han, Wonpil You



## Contents

- Overview
- The structure of Robotic Localization Service in a future proposal
- Conclusion

# Abstract Structure



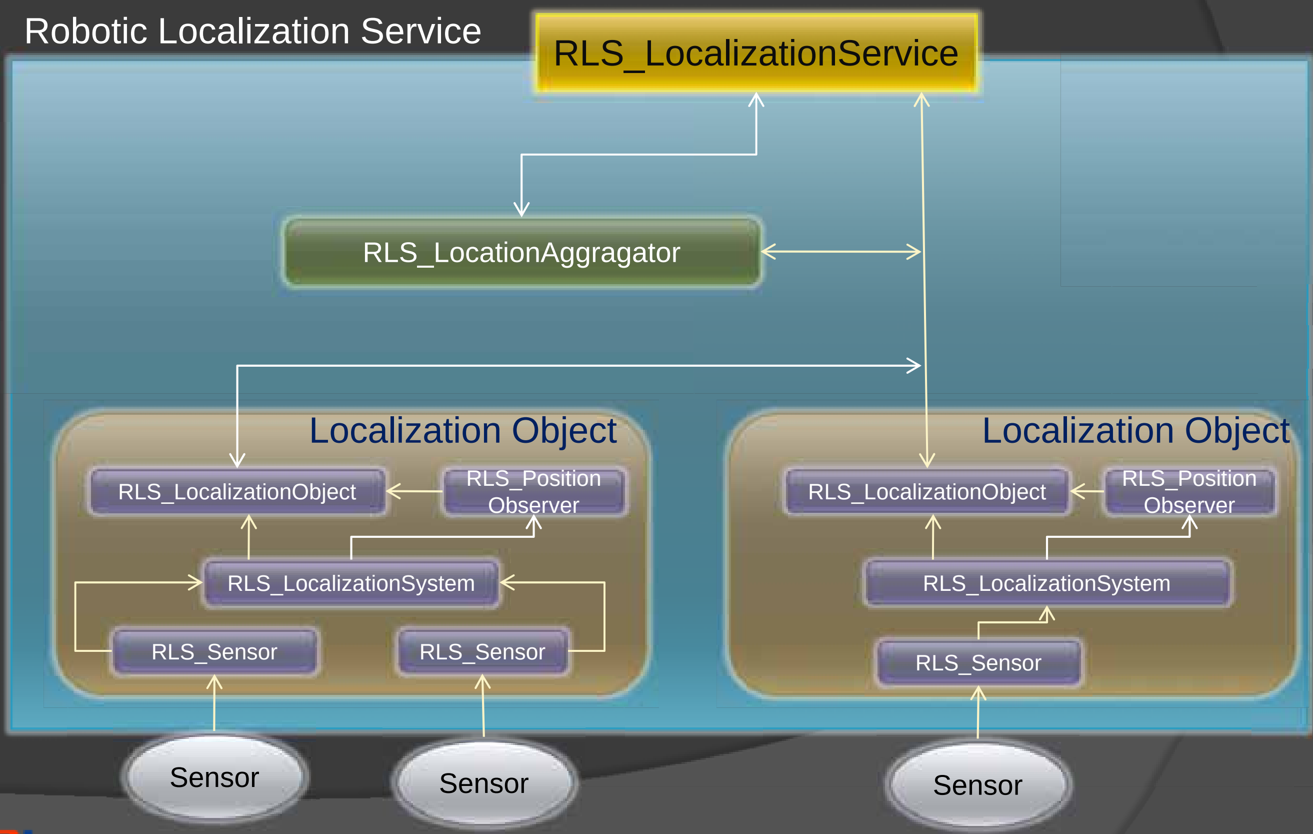





# Functionalities

- LS Interface
  - Accepting requests and publishing localization result
- Localizing Object
  - An actual localization component through converting raw data from sensor(s) into specific location information
- Location Aggregator
  - A means to aggregate various location data from Localizing Objects to produce an integrated response to application

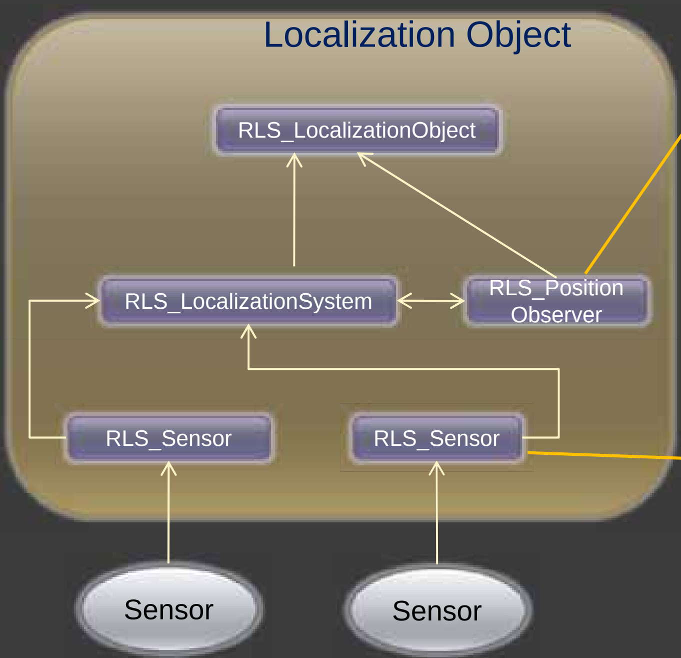
# Proposed Structure







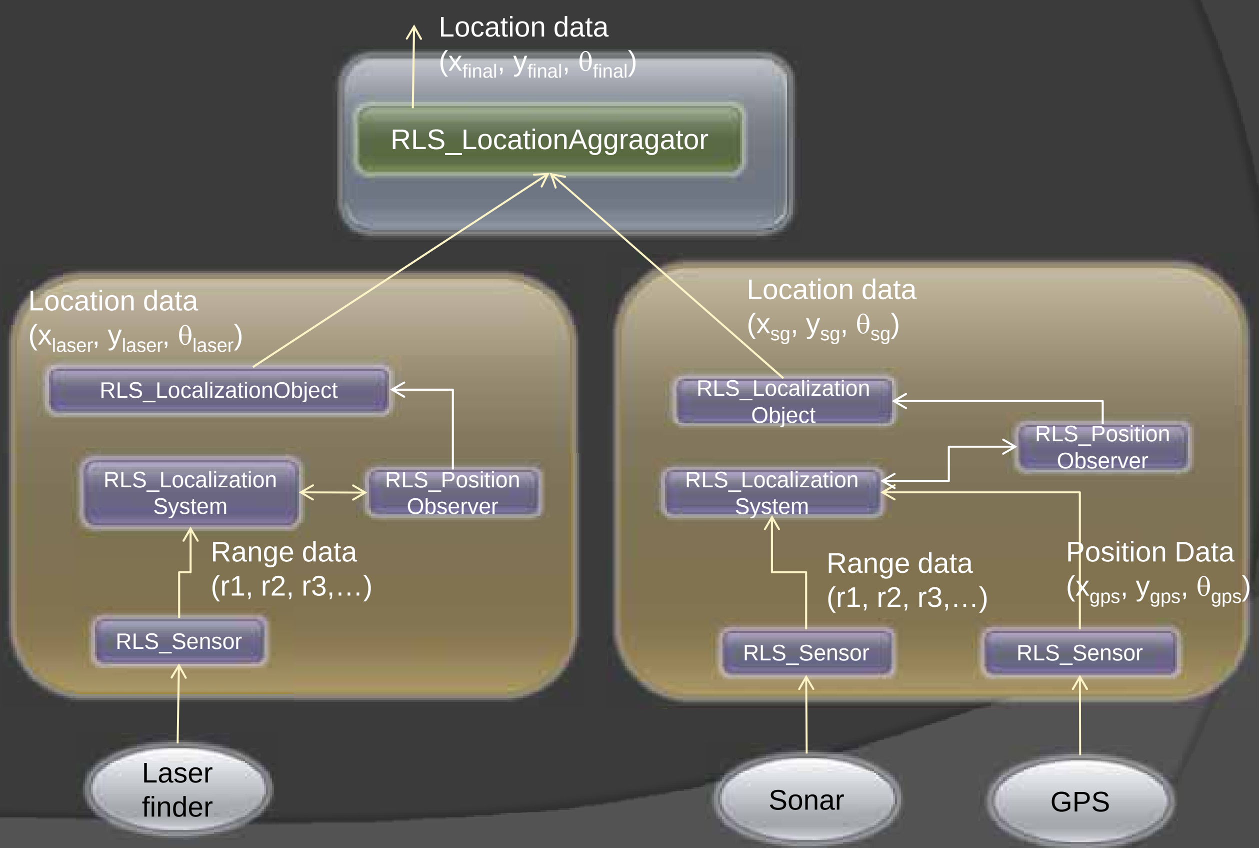

# Localization Object




- Converting raw sensor data into location data (e.g., feature matching)
- Aggregating position data, sensor data

- Connecting to Sensor H/W
- Obtaining raw sensor data and/or position data

# A typical example of Data flow

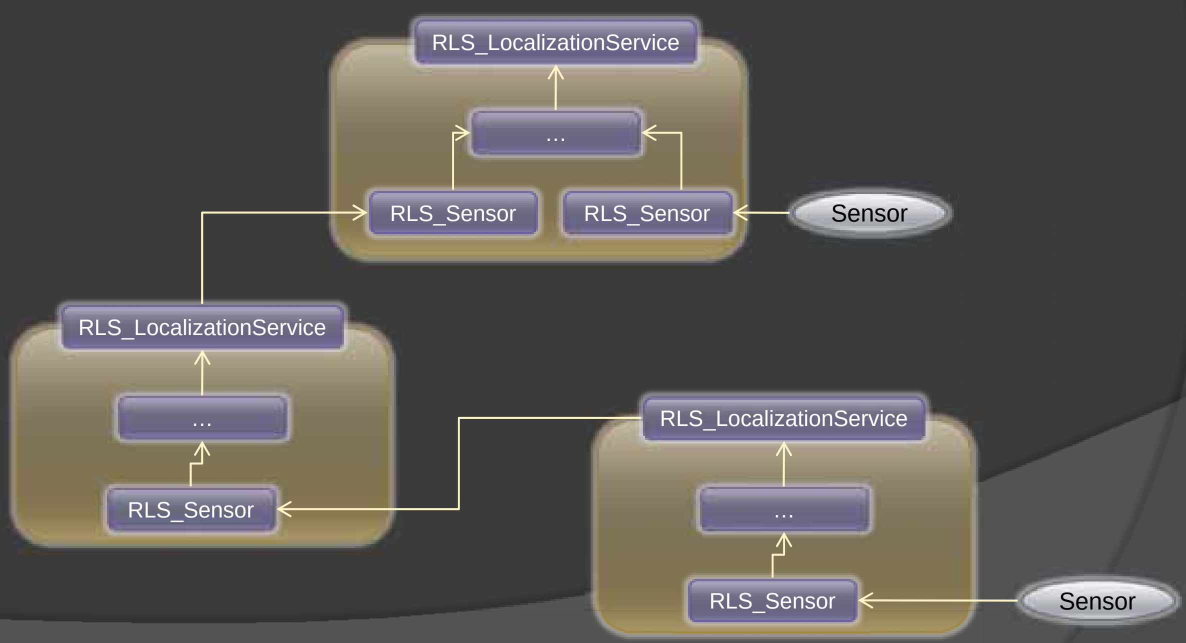







# Hierarchical composition

- One robotic localization service can be operated as one sensor of anther robotic localization service



# Data format

- 3-dimensional position and orientation
- A quality description of data
- Time stamp based on UTC (ISO 8601)
- Covering also raw sensor data (e.g. range data of laser finder)

<<DataType>>
RLS_Position

+posX:float
+posY:float
+posZ:float
+posDistance:vector<<float>>
+posOrientation:float[3]
+zoneID: int
+posQuality:LS_PosQuality
+mesuringTime:DateTime
+measuingEndTime:DateTime

<<DataType>>
RLS_PosQuality

+Mean:float[0..*]
+Std:float[0..*]

+DateTime:string
(e.g. 20070905T153024.123Z)



Robotic Functional Service WG meeting@ Jacksonville, USA

# Coordinate System

- Specifying how to describe spatial coordinate system
  - Coordinate system is represented by information of axes

RLS_SpatialCoordinateSystem

+CoordinateSystemID:string
+CoordinateAxis:RLS_CoordinateAxis

RLS_CoordinateAxis

+AxisName:string[1..*]
+AxisDirection:string[1..*]
+AxisUnit:string[1..*]

# Conclusion

- Robotic Localization Service
  - Specifying Location data format
  - Supporting hierarchical structure
  - All mandatory items will be satisfied in a future proposal





# Q&A

# User Identification for HRI


ETRI

Su-Young Chi, Ph.D


2007. 09. 25




## Scenario Example 1 of User identification

2. Hi, ETRO!
Where is Tom ?

1. Hello Jane !
Hi, Baby!

5. I am in my room !

3. I will find him. !

4. TOM!
Where are you ?

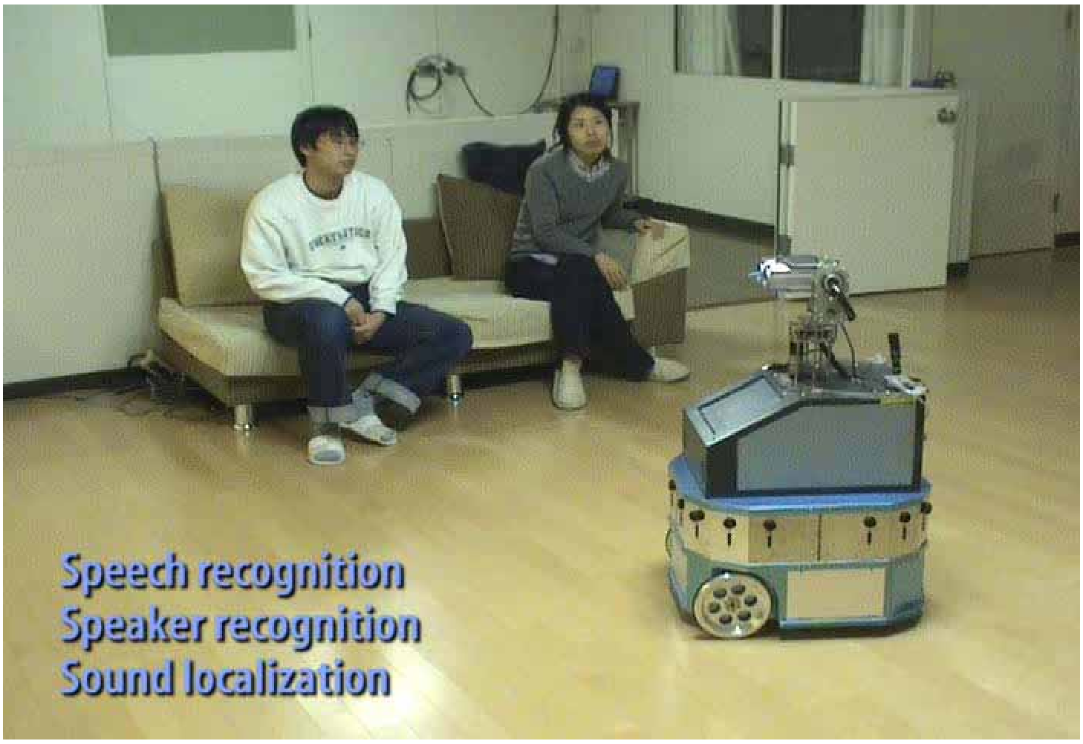
6. I see! Thanks, ETRO!

**HRI Technologies used:**

**Multi Face recognition, Speech recognition,**

**Speech synthesis, Sound localization**

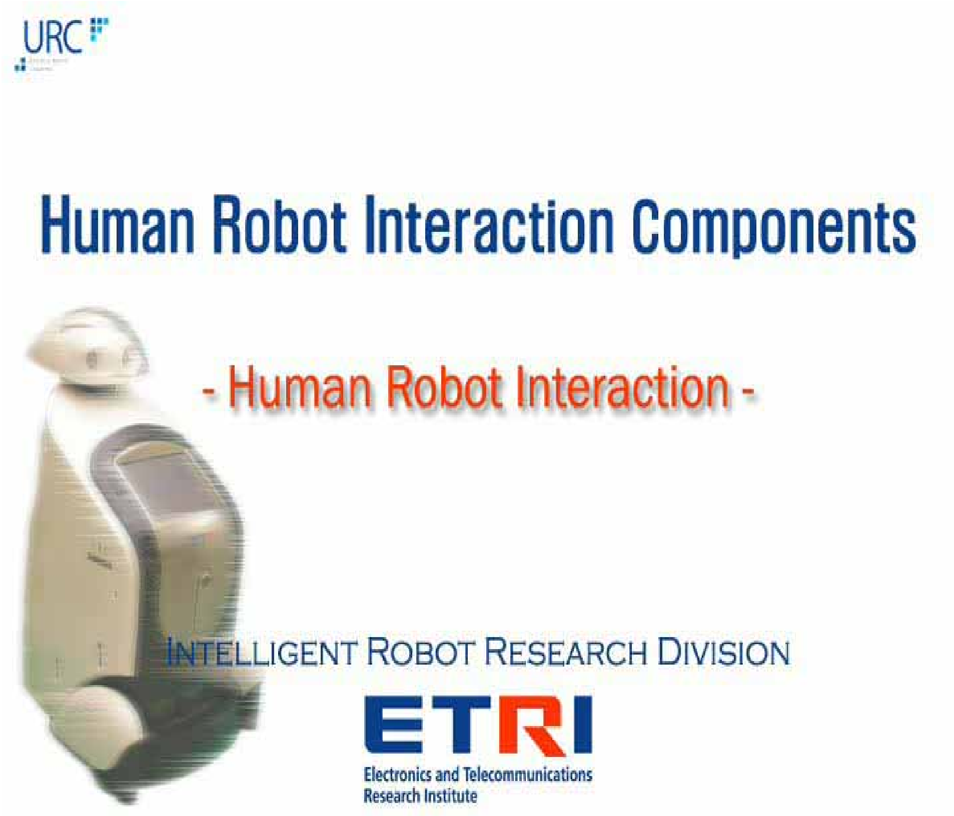
# UI Scenario Demo for HRI API at home








# UI Scenario Demo for HRI API at home



# Difference between Bio API and HRI API

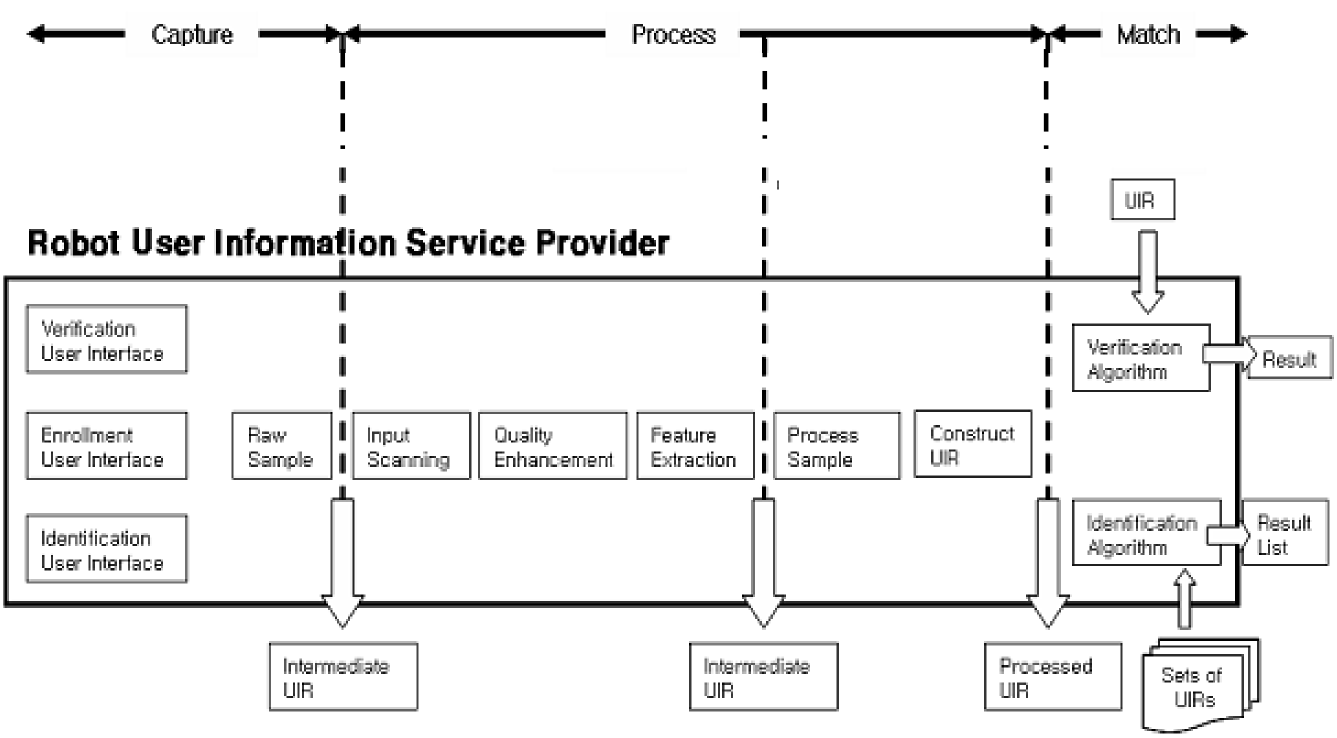
| Bio API | HRI API |
|---|---|
| Human adapts to Bio sensors (camera, FPS, Iris etc.) | Robot adapts to human. |
| Voice is not considered. | Vision + Voice |
| Static environments (Fixed sensing environments) | Dynamic environments (Varying sensing environments) |
| Insensitive to real time processing | Sensitive to real time processing |
| Robustness to environmental noise is less important. | Robustness to environmental noise is more important. |



# Comparison of Characteristics in Environments

| Static environments (Bio API) | Dynamic environments (HRI API) |
|---|---|
| Face recognition in optimal environment | Face recognition in various environments |
| Fixed distance | Varying distance |
| Human following is not considered. | Human following is considered. |
| Single-modal | Multi-modal |
| Single person | Multi person |

# Propose(1): The Methodology of UI Interface Development








# The Standardization of User identification

- **This standard contributes to minimize complications during the application development of User Identification S/W Component for mobile Robots.**
- **It includes Enrollment, Verification and Identification of users. User identification is the crucial starting point for any Human Robot Interaction applications.**
- **Standardization of HRI API will enable us to use the state-of-art HRI technologies with minimum effort, time and cost. Thus, it will significantly contribute to the growth of robot market and industry.**

# Conclusion and summary

- **User identification (UI)** is one candidate item for Human Robot Interaction standardization
- This presentation shows
  - typical scenario of UI with many sub technologies of UI.
  - Differece of fucntional characteristics and environments between Bio APIs and HRI APIs
- Candidate Items for standardization of HRI could be **speech recognition, visual recognition, multi modal recognition, face recognition,** and so on.
- We are looking for most common item for **HRI standardization**. Join us!

# Robotic Localization System specification proposal overview (draft, in progress)

2007/09/25
NISHIO Shuichi
ATR / JARA

# Design Concepts

1. Expressible
   – can express complex location information
2. Connectable
   – easily connected to related systems
3. Simple
   – simple system can be made in a simple way
4. Reusable
   – components can be easily reused

# 1. Expressible

- versatile location-related information to be expressed in an uniform manner
  – where (spatial position, pose, velocity, …)
  – when (measurement time)
  – how well (error estimate)
  – who (target identitiy)



# 2. Connectable

- can connect to heterogeneous systems
  – share GIS resources
  – easy translation to GML
- allow dynamic configuration
  – robots moving from environments to another
  – auto-negotiation feature
- network-oriented architecture
  – but also standalone use
- built on standard middlewares
  – CORBA, SOAP, XML-RPC, Java-RMI, …

# “location” information

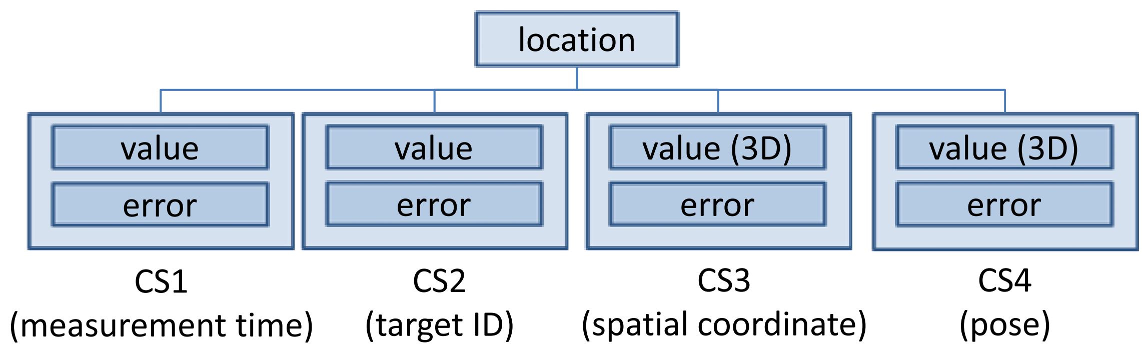
- spatial position, pose
  - X/Y/Z, r/deg, lat/lng, …
- velocity, acceleration, …
- target identity
- (measurement) time
- …

- every elements treated uniformly as “coordinates” on a certain coordinate system





# RLS-location: example



# OpenGIS coordinate systems

- basically “referenced”
  - defined as a conversion from existing CRS
    - all points convertible to some absolute position on earth
- all elements defined and registered
  - allows automatic inter-coordinate translation
- no relative/mobile coordinate system
  - actually, not impossible, but usage unclear
- limited to 1D/2D/3D



# Example: OpenGIS definition

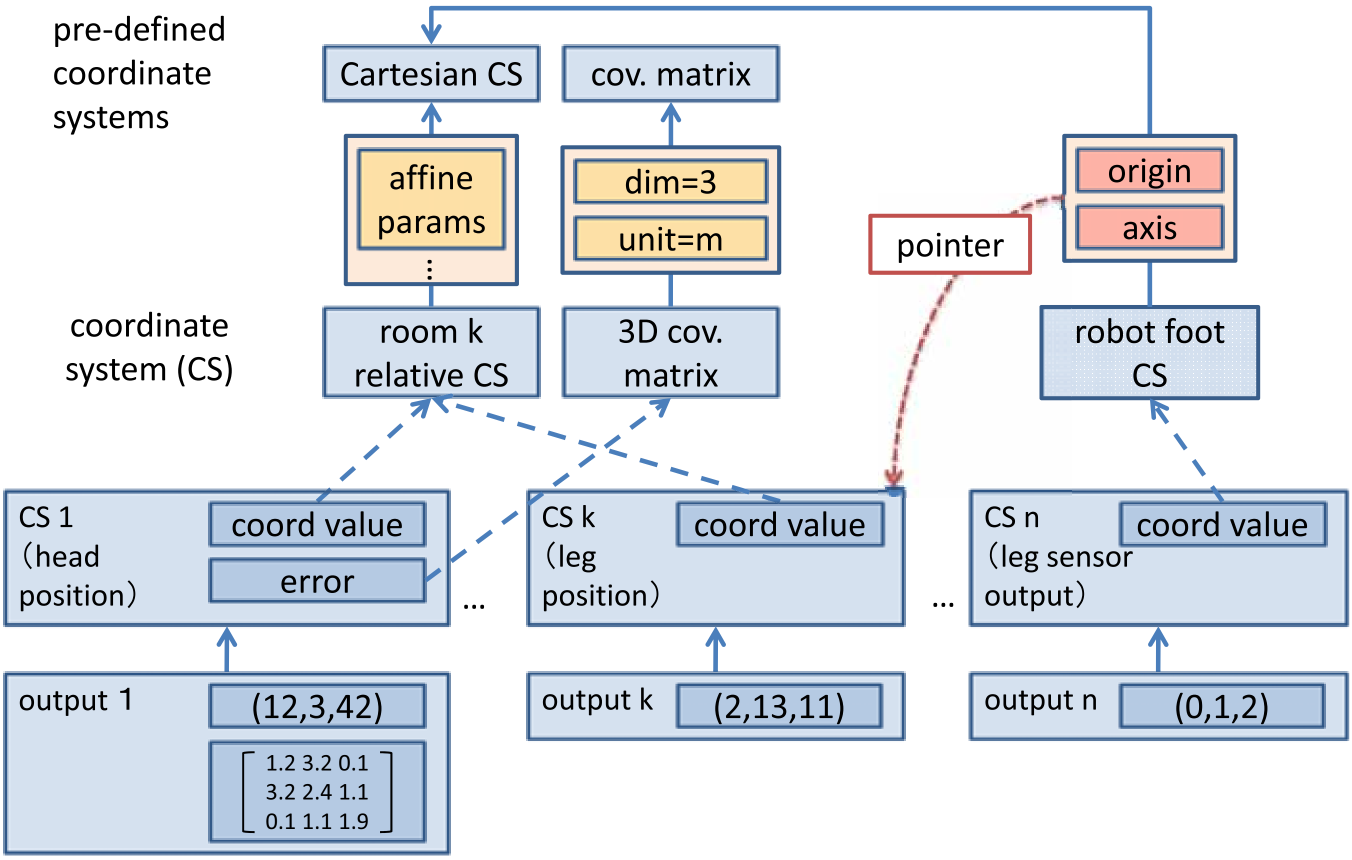
```
<Conversion><metaDataProperty><epsg:CommonMetaData>
      <epsg:type>conversion</epsg:type>
      <epsg:alias alias  "Japan zone VI" code  "725” codeSpace  "urn:x-ogp:def:naming-system:EPSG:7302"/>
      <epsg:informationSource>Ministry of Construction; Japan.</epsg:informationSource>
      <epsg:sexagesimalValue uom  "urn:x-ogp:def:uom:EPSG:9110">
        <epsg:degrees>136</epsg:degrees>
        <epsg:propertyReference xlink:href  "urn:x-ogp:def:parameter:EPSG:8802"/>
      </epsg:sexagesimalValue></epsg:CommonMetaData>
  </metaDataProperty>
  <identifier codeSpace  "EPSG">urn:x-ogp:def:conversion:EPSG:17806</identifier>
  <method xlink:href  "urn:x-ogp:def:method:EPSG:9807"/>
  <parameterValue>
    <ParameterValue>
      <value uom  "urn:x-ogp:def:uom:EPSG:9102">36.0</value>
      <operationParameter xlink:href  "urn:x-ogp:def:parameter:EPSG:8801"/>
    </ParameterValue>
  </parameterValue>
  ...
</Conversion>
```

# RLS coordinate systems

- extend OpenGIS framework to
  - allow relative/mobile coordinate systems
  - allow incomplete location
  - allow arbitrary dimensions
  - allow “string-valued” coordinate systems
    - for target ID and others
  - allow more flexible coordinate system definitions
    - Denavit-Hartenberg notation
    - conversion by table (for ID and others)
- retain auto-translation feature of OpenGIS
  - can translate to GIS coordinates, if necessary



# RLS-CS: example



# RLS-CS: example

```
<rls:DefineElement id=“robot12CS“ srsName=“urn:TestEnvironment”>
   <rls:baseStructure>
     <rls:RelativeCartesianCoordinateSystem srsName="urn:..." />
   </rls:baseStructure>
   <rls:definedByConversion>
     <gml:usesMethod xlink:href="urn:xxxx" />          <!-- affine transform -->
     <rls:baseCRS xlink:href="urn:TestEnvironment:baseCartesianCRS" />
     <rls:ParameterList>
      <!-- specify moving origin -->
      <rls:parameter name=”origin” type=”dynamic”>
         <rls:entry name="urn:TestEnvironment:getLocation"/>
         <rls:parameterList>
               <rls:parameter name="targetID">
                 <rls:TargetID referenceName="urn:Test_Environment:RobotPosition" />
               </rls:parameter>
               <rls:parameter name="locationElementName">position</rls:parameter>
         </rls:parameterList>
      </rls:parameter>
      …
     </rls:ParameterList>
   </rls:definedByConversion>
  </rls:DefineElement>
```



# “location” is probabilistic

- measured localization results are always probabilistic
  - error information required
- flexible, extendable framework for error representation required
  - reliability
  - covariance matrix
  - MoG
  - particles
  - …

# example 1: covariance matrix


```xml
<!-- 6D (position:3D + velocity 3D) covariance matrix -->
<rls:CovarianceMatrix gml:id="TT_CovMat6D" dim=6>
 <rls:targetPointElementList>
  <rls:targetPointElement id="position" />
  <rls:targetPointElement id="velocity" />
 </rls:targetPointElementList>
</rls:CovarianceMatrix>

…
 <rls:EstimatedError srsName="urn:Test_environment:TT_CovMat6D">
  <rls:lowerTriangularMatrix>
   0.11
   ...
   0.09 0.21 0.01 0.09 0.21 0.01
  </rls:lowerTriangularMatrix>
 </rls:EstimatedError>
```

# example 2: particle


```xml
<rls:PointElement name="id“ srsName=“urn:Test_environment:ID_131>
  <rls:value>LID_123121<rls:value>
  <rls:EstimatedError  srsName="urn:Test_environment:131234">
   <rls:particleList>
      <rls:particle>
       <rls:value>LID_123121</rls:value>
       <rls:likelihood>0.722</rls:likelihood>
      </rls:particle>
      <rls:particle>
       <rls:value>LID_93122</rls:value>
       <rls:likelihood>0.121</rls:likelihood>
      </rls:particle>
       ...
   </rls:particleList>
  </rls:EstimatedError>
 </rls:PointElement>
```

# resource repository

- keep coordinate / namespace definitions
  - coordinate system translations, format definitions, etc.
- distributed, cross reference architecture
  - based on W3C xlink
- enable easy or automatic translation between coordinate systems
  - allows connection between heterogeneous systems





# 3. Simple

- simple systems are described simply
  - prepare reasonable default values
  - omit redundancy if necessary
- format options
  - descriptive, highly exchangeable format
    - XML-based (can use EXL for efficiency)
  - lightweight format
    - WKB (Well-Known-Binary) based
  - can choose vendor-specific / traditional formats
    - e.g. NMEA

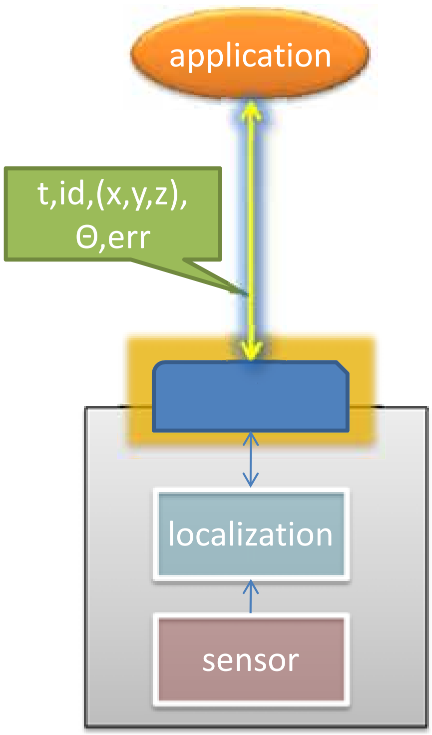
# 4. Reusable

- simple, generic framework
  - only provide basic, common functionalities
  - avoid vendor / algorithm specific items
- machine-readable description
  - components self-describe their abilities
  - searchable repositories
- inter-component connection negotiation
  - semi-automatic component selection and initialization
  - plug-n-play, exchangeable components





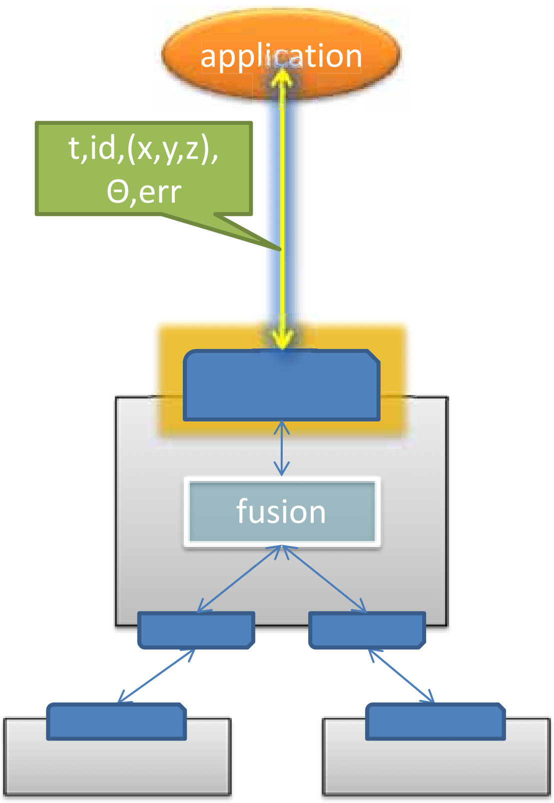
# basic component




- native sensors, maps, etc. hidden inside the component
- treated as a ‘black-box’

Localization Module

# aggregation / fusion

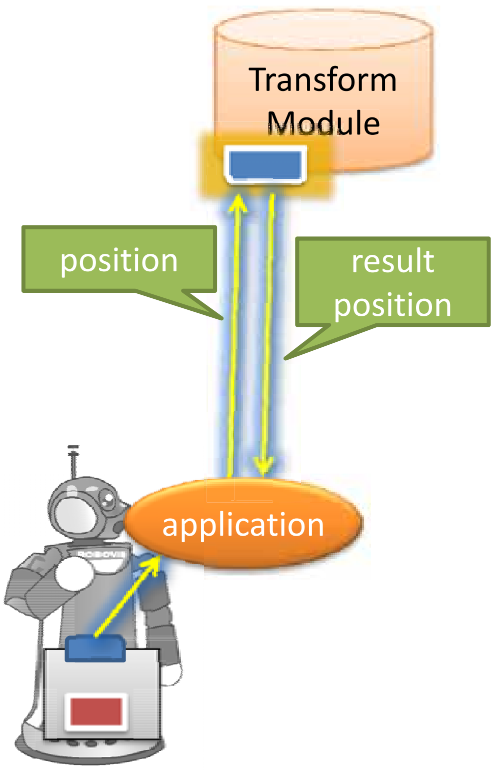



- the aggregator appears as basic localization component
  - what's happening inside is not important for users
- use the same interface as basic component
  - detailed aggregation parameters set by vendor interface
- holds also input interfaces



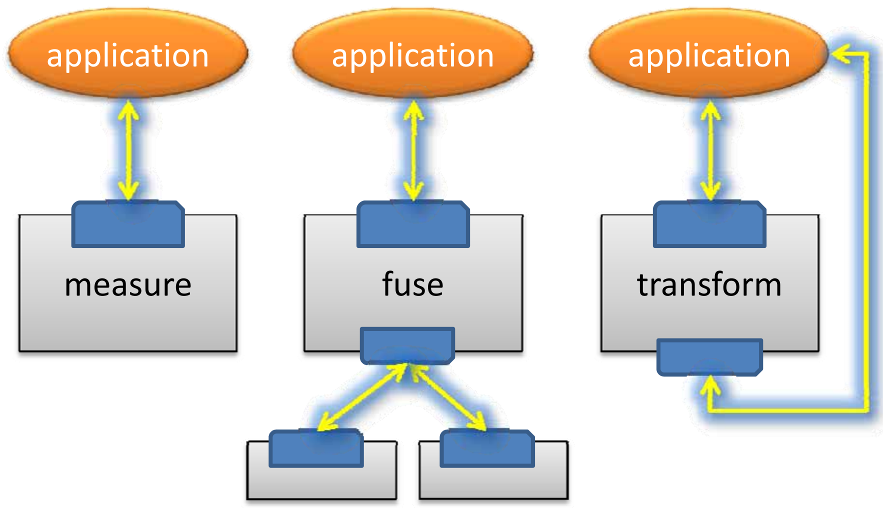


# transform




- the transform module also appears as basic localization component (to application)
  - what's happening inside is not important for users
- use the same interface as basic component
  - detailed transformation parameters set by similar configuration interface
- holds also input interfaces

# uniform architecture




**homogeneous n-input, 1-output interface**

- high reusability
- allows recursive or cascading connection



# ability exchange

**Request:**

```
<?xml version="1.0" encoding="UTF 8"?>
<GetCapabilities xmlns="http://www.hoge.org/rls/1.0">
  <Sections Section="All">
</GetCapabilities>
```

**Response:**

```
<?xml version="1.0" encoding="UTF 8"?>
<Capabilities xmlns="http://www.hoge.net/rls/1.0" xmlns:rls="http://www.hoge.net/rls/1.0" xmlns:xlink="http://www.w3.org/1999/xlink"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema instance" xsi:schemaLocation="http://www.hoge.net/rls/1.0
        fragmentGetCapabilitiesResponse.xsd">

  <ServiceIdentification>
    <Title xml:lang="ja">SICK LRF output module</Title>
    <Abstract xml:lang="en">
      output module for Laser Range finder xxxx series
      Contact: webmaster@hoge.co.jp
    </Abstract>
    <ServiceType>OMG:RLS</ServiceType>
    <ServiceTypeVersion>1.0.0</ServiceTypeVersion>
    <NumInputs value="1" />
    <NumOutputs><max value>3</max value></NumOutputs>
  </ServiceIdentification>
  <ServiceProvider>
    <ProviderName>foobar corporation</ProviderName>
    <ProviderSite xlink:href="http://www.hoge.co.jp/"/>
  </ServiceProvider>
</Capabilities>
```

# data exchange format

allow 3 types of formats

1. RLS format (OpenGIS GML-based format)
2. WKT/WKB-based
3. vendor specific



# RLS format

- define a new format based on GML
- for easy data exchange
  - can use existing parsers / XML-DB systems
  - easy translation to GML
- EXL (binary XML by W3C) be used for compression

# RLS format: example

```
<rls:Point srsName="Test  environment:fmt131"id="KJLSDF234123413421">
  <!-- time / no error info -->
  <rls:PointElement name="time" value="20070925T062312.1231"/>
  <!-- target ID / particle error -->
  <rls:PointElement name="id">
    <rls:value>LID  123121</rls:value>
    <rls:EstimatedError srsName="urn:Test  environment:particle131">
      <rls:particleList>...</rls:particleList>
  </rls:PointElement>
  <rls:PointElement name="position">
    <rls:value>123.121 312.121 1.2313</rls:value>
  </rls:PointElement>
  …
  <!-- covariance matrix for position/velocity estimation -->
  <rls:EstimatedError srsName="urn:Test  environment:TT  CovMat6D">
    <rls:lowerTriangularMatrix>0.11 ...</rls:lowerTriangularMatrix>
  </rls:EstimatedError>
</rls:Point>
```





# WKT/WKB-based format

- Well-Known Text/Binary format
  – used in OpenGIS / DB systems
- for efficient, massive data exchange
- detailed format are specified through configuration
  – format information not included in the data flow

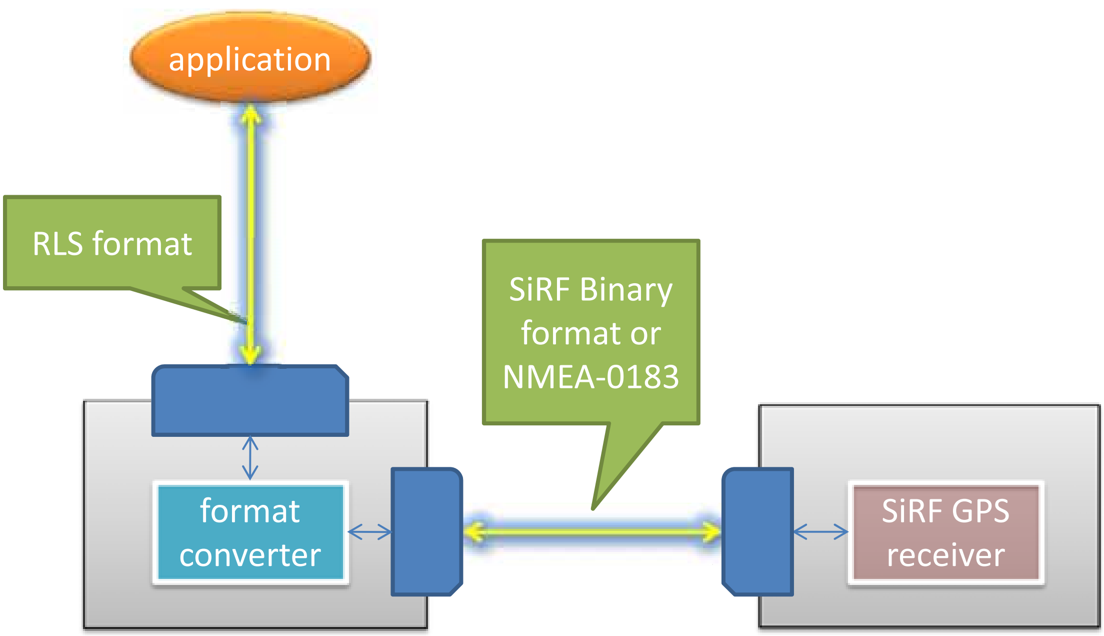
```
// byte : 1 byte
// uint32 : 32 bit unsigned integer (4 bytes)
// double : double precision number (8 bytes)
// Building Blocks : Coordinate, LinearRing
Point {
    double x;
    double y}
PointZ {
    double x;
    double y;
    double z}
…
```

# vendor-specific format

- formats are defined by translation
  - format ID and translation module / method should be defined in the repository
- vendors shall provide
  - component parameter description
  - format definitions for repository
  - format translation module
- allowing vendor-specific outputs will reduce burden for vendors and existing system users
  - provide easy switching path to the new standard



# vendor format: example



# dynamic configuration

- robots may move to different environments
  - roaming
- new sensors in new environments
  - allow automatic, dynamic configurations

```
//do necessary module initialization
localizer1->init(settings1);
localizer2->init(settings2);
fuser->init( settings_fuser );
translator->init( settings_translator );
// create a negotiator instance, and do negotiation
negotiator = new Negotiator();
negotiator->connect(localizer1, fuser);
negotiator->connect(localizer2, fuser);
negotiator->connect(fuser, translator);
if ( negotiator->negotiate() != SUCCESS ) return FAILURE;
```





# methods

2 types of methods

- configuration-based
  - XML document describing configuration is passed
  - all commands / parameters are described in the configuration
  - single interface
- traditional
  - entry point defined for each function
    - ability request, parameter setting, initialization, …

# methods: pros/cons

- configuration based interface is suitable for
  - complex system
    - easier to specify in a single document
  - adaptation to web services
    - controls are also data exchange
- traditional interface is suitable for
  - simple usage
    - where mostly no configuration is required
  - moving from standard systems
    - easy for code implant

# methods: example

- configuration based

```
XML_Sentence* XML_getCapabilities(const XML_Sentence &);
```

- traditional

```
SEP_Result SEP_getModuleID(std::string &id);
SEP_Result SEP_getNumInterfaces(int &in, int&out);
SEP_Result SEP_getModuleDescription(std::string &);
SEP_Result SEP_getCapabilityDescriptionURN(std::string &);
```

# typical usage flow

(OP) = optional

0. (OP) search for component

A

1. (OP) request output format info
2. (OP) specify output format
3. (OP) specify output format parameters

B

4. (OP) request output method info
5. (OP) specify output method
6. (OP) specify output method parameters

C

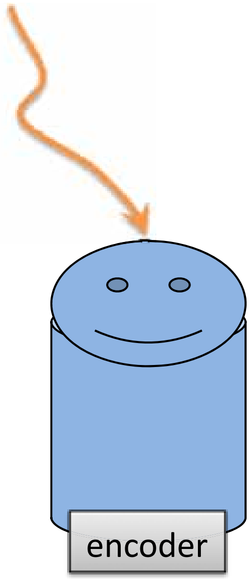
7. (OP) specify initial position
8. data exchange
9. (OP) specify aux position info

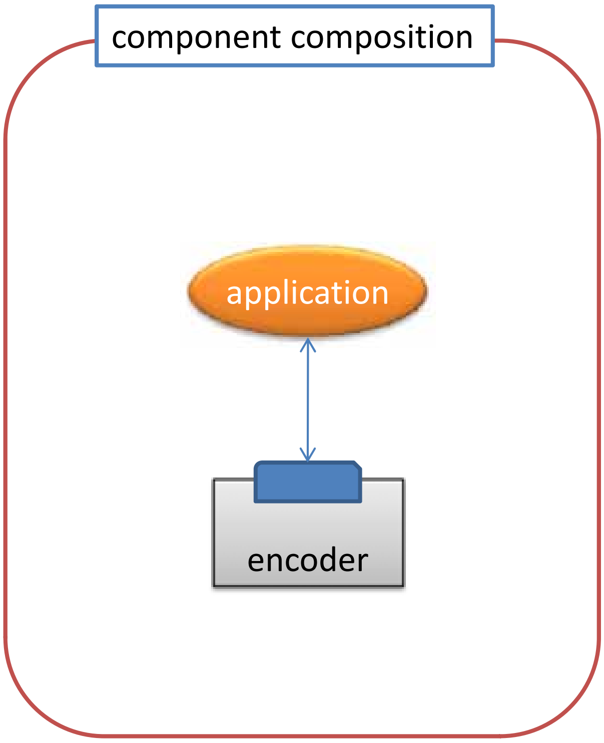




# CASE STUDIES

# Ex1 : <single sensor, embedded>

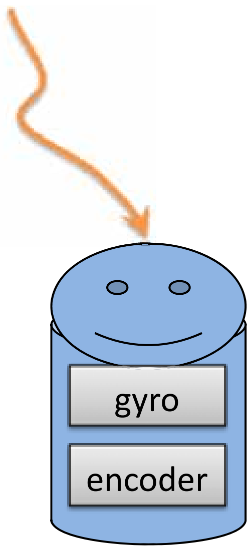


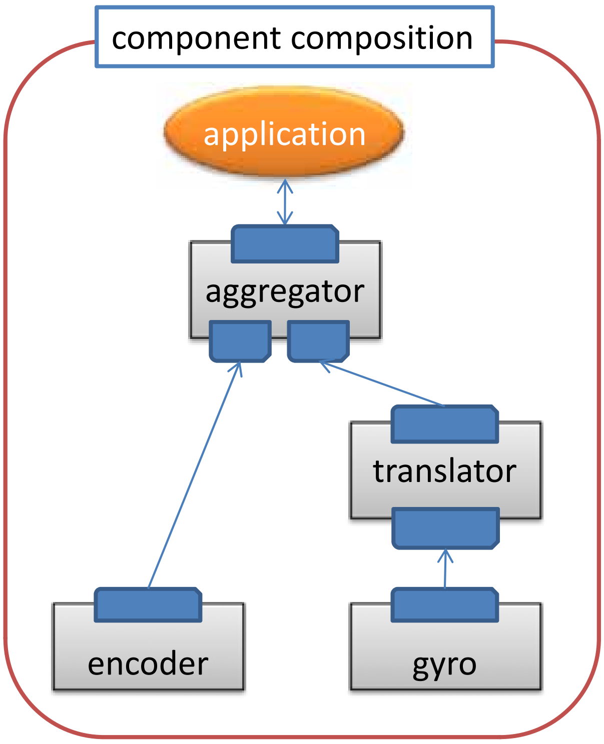





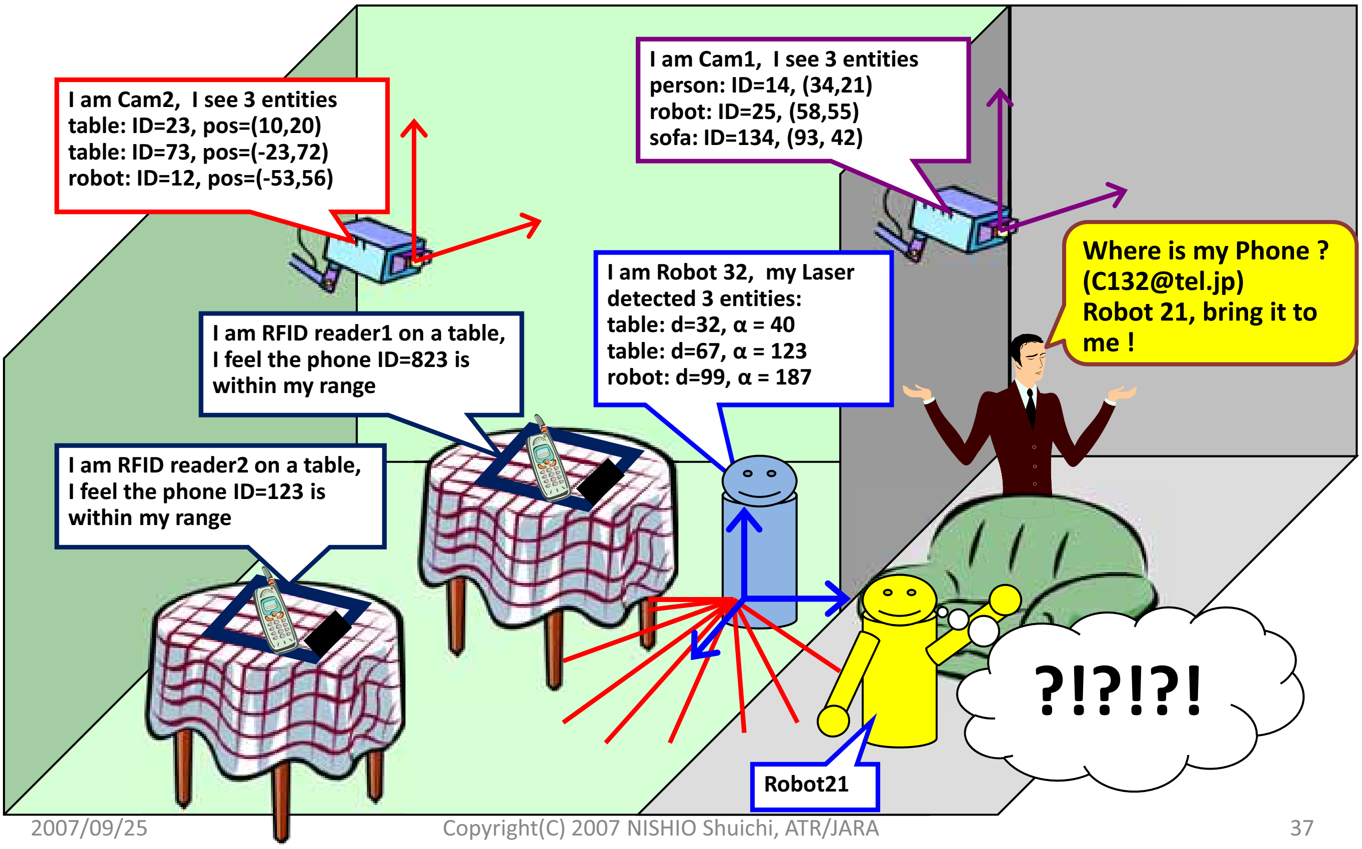



# Ex2: <multiple sensors, embedded>



# Ex3: <networked-robots>

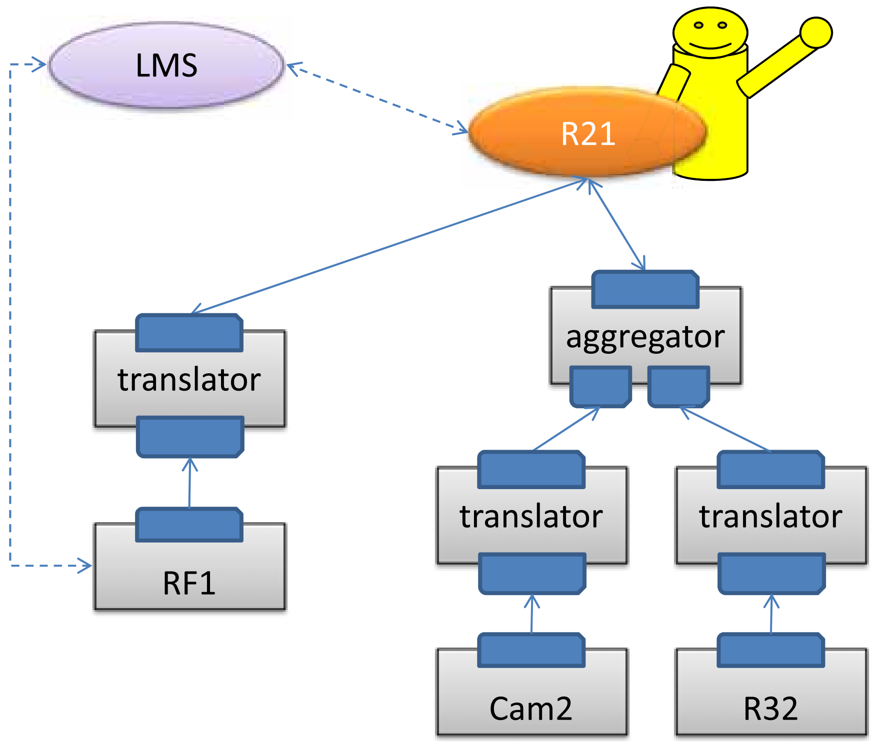





# Ex3(SEI): step example

1. R21 searches for entities with LRS (in the target area)
2. R21 asks the entities to search for C132@tell.jp
3. RFID-reader 1 (RF1) replies that C132 is “nearby”
4. R21 asks RF1 for its position
5. RF1 searches for entities that can measure itself
6. RF1 asks the resulting entities for its position
7. Cam2 and R32 each returns 2 results
8. RF1 aggregates the results from Cam2 / R32, and returns to R21
9. R21 translates the given locations to its CS, and starts moving toward them for inspection

# Ex3: sample configuration



# Typical Examples from Tsubouchi

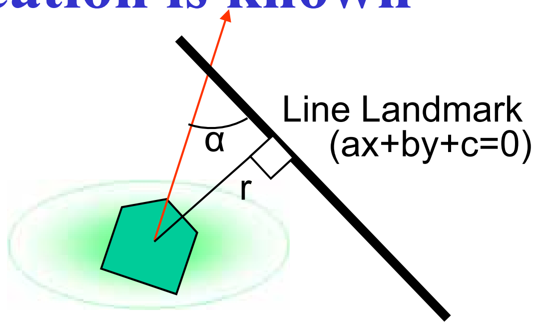
**Takashi Tsubouchi,** Professor

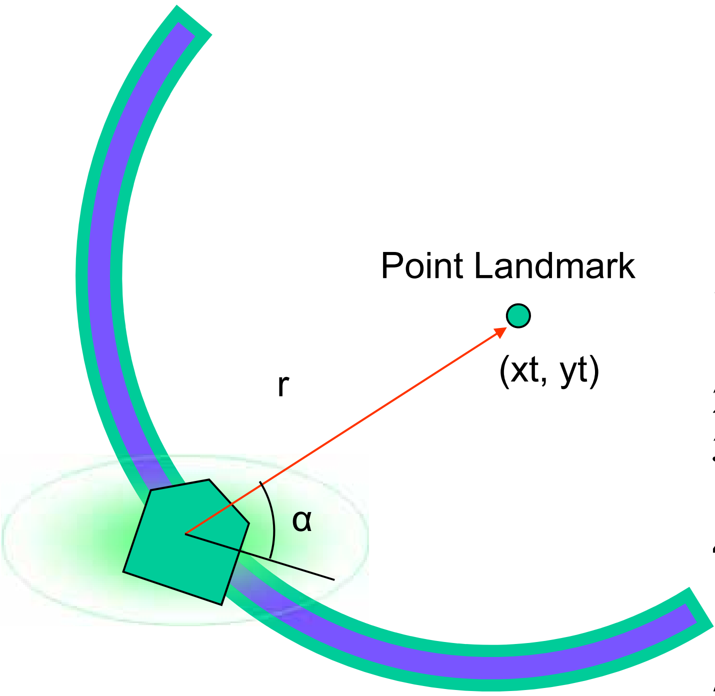
**Intelligent Robot Laboratory,**

**University of Tsukuba, Japan**

筑波大学 University of Tsukuba

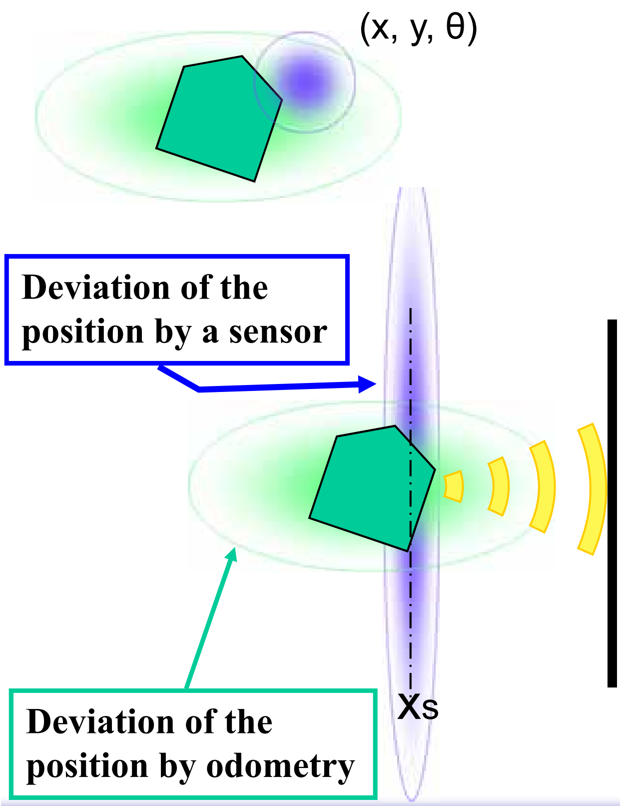
## Case1:Robot position correction to watch landmark whose location is known

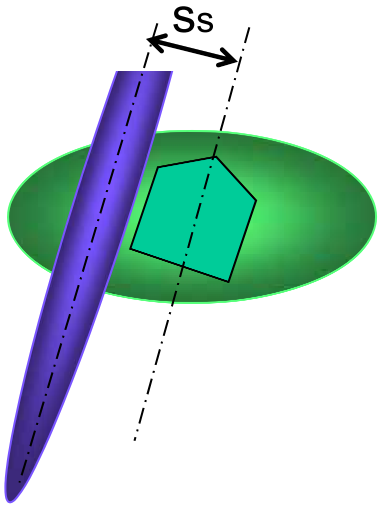



1. **The robot holds its position based on odometry.**
2. **Observing a landmark by a sensor.**
3. **The robot knows relative position to the land mark**
4. **The location of the landmark is known in the coordinate system fixed on the ground**
5. **The robot can know more accurate position.**

# Case1:Robot position correction to watch landmark whose location is known (cnt'd)

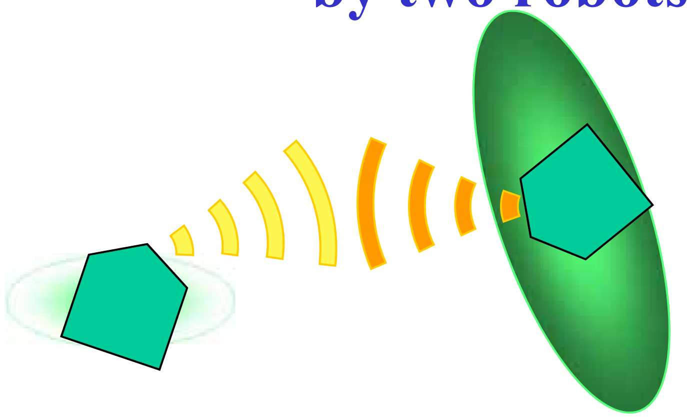



- **How to aggregate the two positions which are measured by odometry and a sensor with a landmark?**



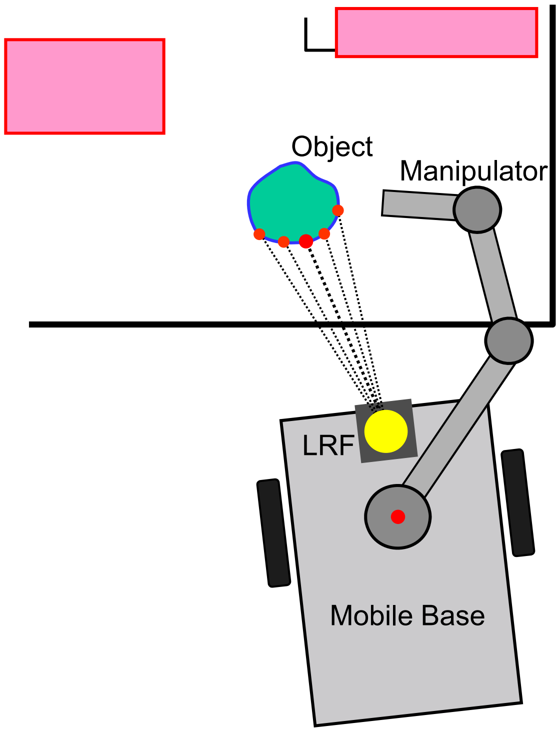
# Case2: Position identification mutually by two robots



1. **The two robot can exchange any information via communication channels.**
2. **The two robots hold their positions based on odometry independently.**
3. **Observing other robot each other by range sensors.**
4. **They come to know relative position each other.**
5. **They can know more accurate positions.**

# Case3: Mobile manipulator application 1

1. Location of an object to be manipulated is approximately known.
2. The robot identifies the location of the object more definitely.
3. The robot moves to the appropriate position to manipulate the object.
4. The robot grasp the object.

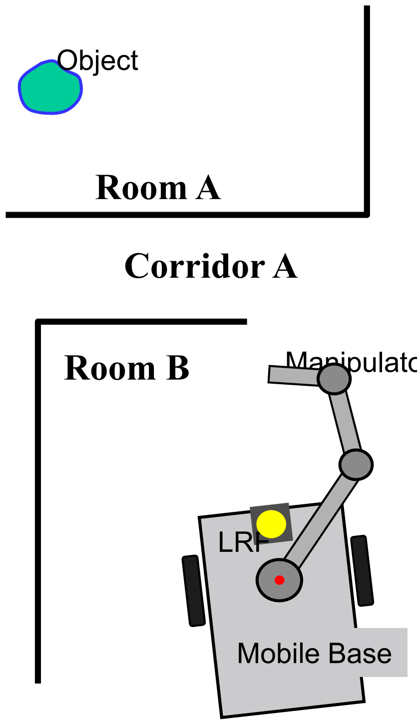







# Case4: Mobile manipulator application 2

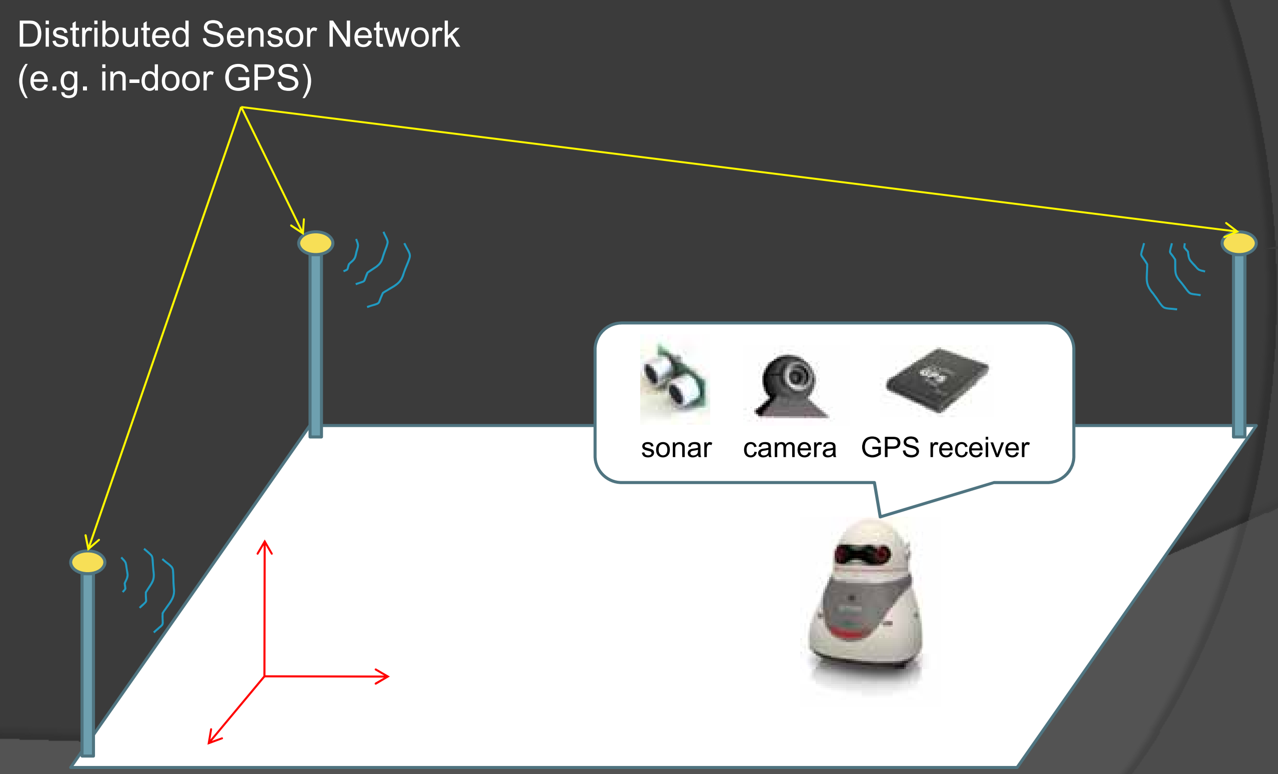
1. An object is placed in some location in room A.
2. The robot knows it is in the room B
3. The robot should a plan such a path that it is from room B to room A via corridor A.
4. The robot should find way points to get the object.
5. The robot moves via the way points.
6. The robot approaches to the object and grasp it.



# SCENARIOS FOR COMPARISON OF PROPOSALS

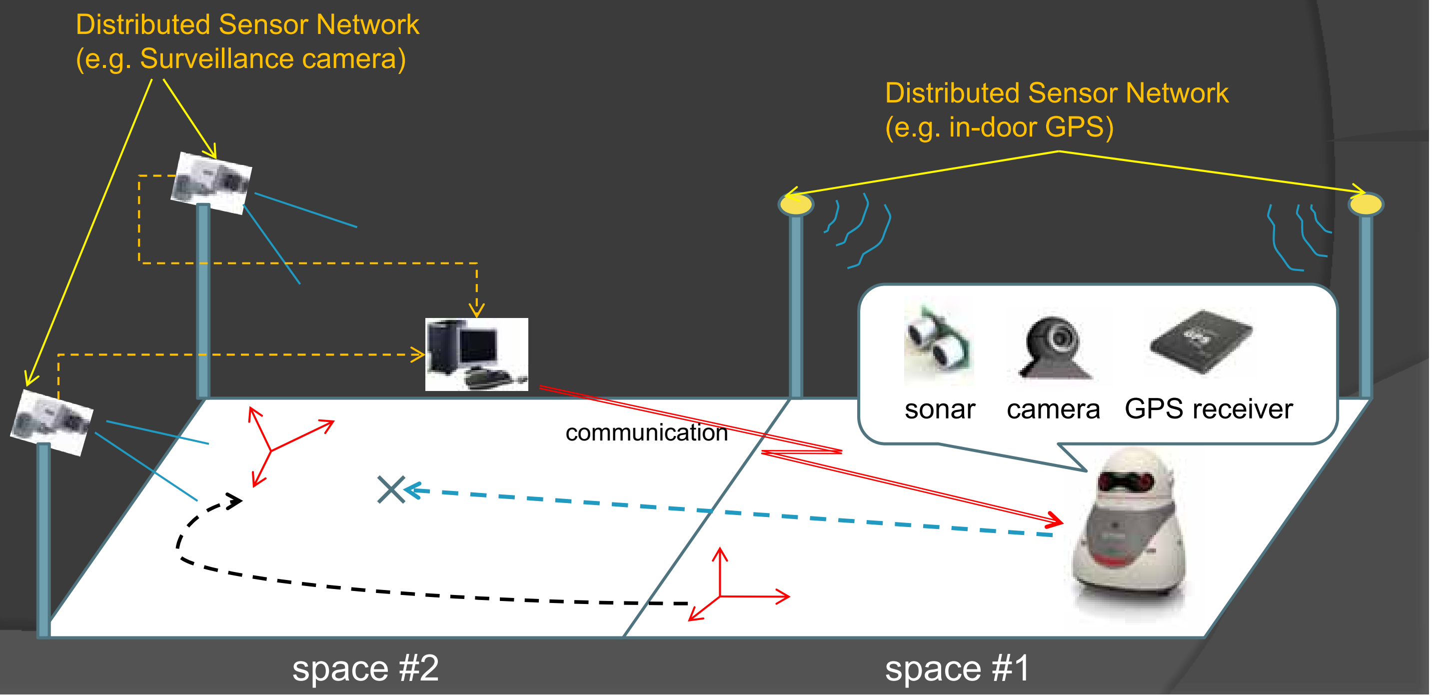
## Scenario I

- A robot is in space #1
- The robot has sonar and camera
- In-door GPS gives the robot absolute location



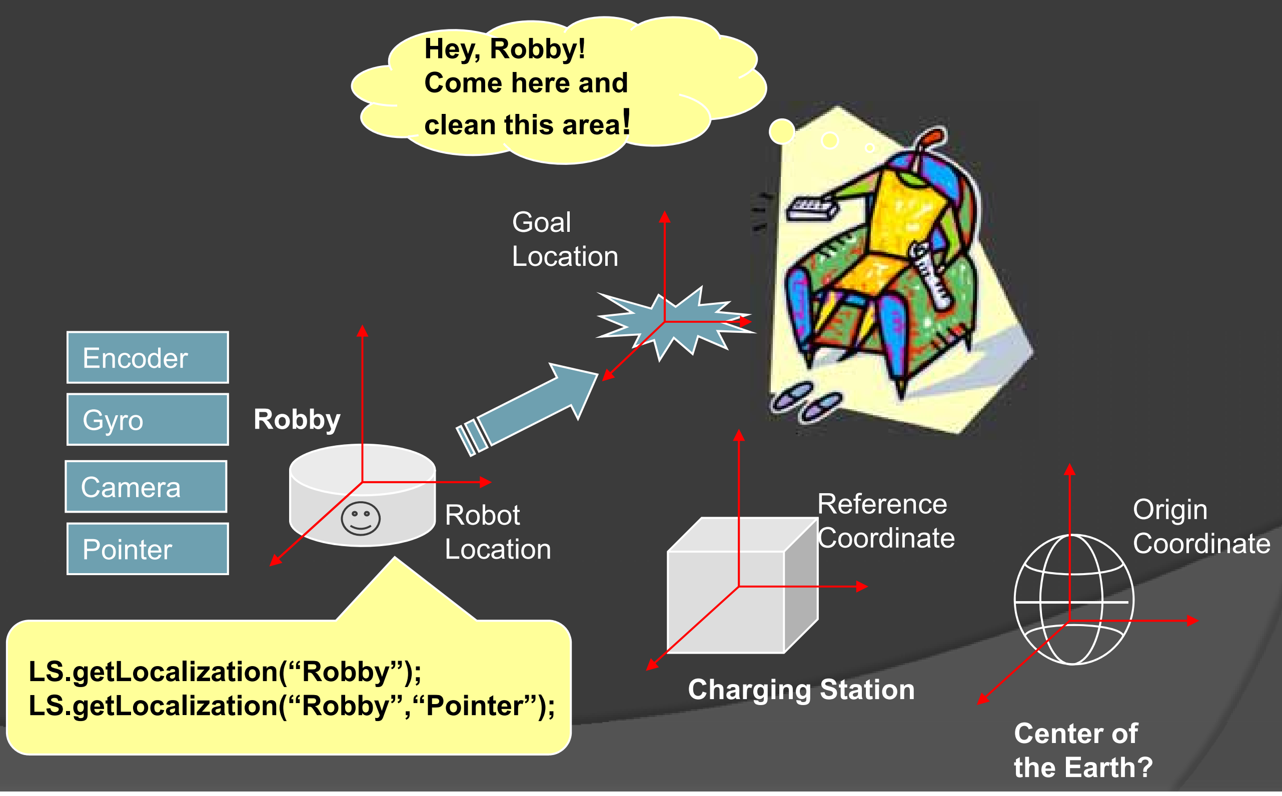
# Scenario II

- A robot move from space #1 to space #2
- The robot has sonar and camera
- Two sensor networks gives the robot absolute location
  - space #1: In-door GPS
  - space #2: surveillance camera
- There are different coordinate systems between space #1 and space #2



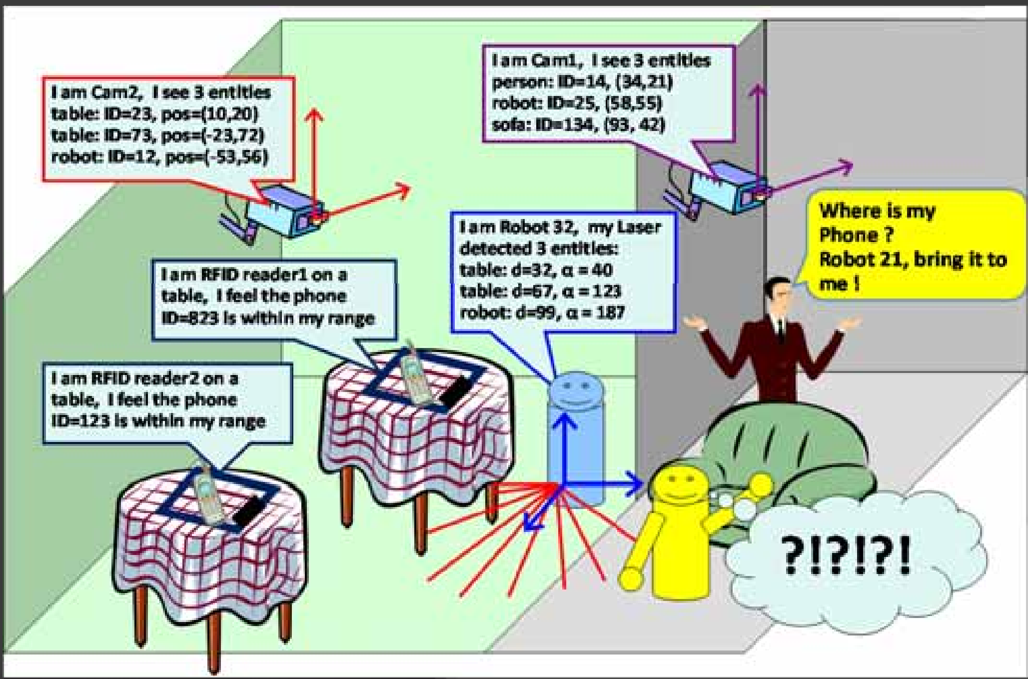

# Scenario III

- Embed encoders and a gyro for the relative position, a camera for the absolute position and a pointer sensor which can find the position of the area to be cleaned



# Scenario IV

- A typical example for entities in the RFP document



# Robotics-DTF Plenary Meeting
# Opening Session

September 26, 2007

Jacksonville, FL, U.S.A.

Hyatt Regency Jacksonville Riverfront





# Approval of the Brussels Minutes

Minutes review

- **Localization Service for Robotics RFP issued**
- **Robotics-DTF Seminar: (34 participants+)**
- **Robotics/SDO Joint Plenary: (25 participants)**
  - **2 WG Reports**
  - **2 Interesting Talks**
    - Introduction to CANopen (Holger Zeltwanger, CiA)
    - Anybot studio - Samsung Network Robot SW Platform (Hyun-Sik, Samsung)
- **Joint meeting with C4I: (Tue.)**
- **Joint Meeting with ManTIS: (Thu.)**

Jacksonville Meeting Quorum : 5

AIST, ETRI, JARA, Samsung, Shibaura-IT, Technologic Arts, (NEDO)

Minutes taker(s):

- Shuichi Nishio
- Su-Young Chi

# Agenda Review

09:10-10:00 WG Reports and Roadmap Discussion
10:00-10:40 Contact Reports:
10:40-11:00 Discussion of Human-Robot Interaction
11:00-11:30 Publicity SC Report,
Next meeting Agenda Discussion
11:30 Adjourn joint plenary meeting

11:30-12:00 WG Co-chairs Planning Session
(Agenda for Burlingame, Draft report for Friday)

**please check our final agenda**

# Robotic Localization Service WG Status Report Jacksonville Meeting

2007.9.26

Co-Chairs: Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio

## Schedule

- Monday
  - 09:00-10:00 Robotics Steering Committee
  - 13:00-17:00 Robotic Localization Service submitter's meeting
- Tuesday
  - 13:00-17:00 Robotic Localization Service submitter's meeting
- Wednesday
  - 09:00-12:00 Robotics Plenary
  - 12:00-14:00 OMG Plenary

## TOPICS IN THIS MEETING

- Three presentations given by planned submitters
  - ETRI, Samsung, JARA
- Three typical case scenario chosen
  - for better comparison of submissions
  1. single environment, single sensor scenario
     - robot navigation
  2. single environment, multiple sensor scenario
     - robot navigation
  3. multiple environment, multiple sensor scenario
     - robot navigation and manipulation

## ROADMAP

- 12/Nov/07 Initial Submissions due
- 03/Dec/07 Voter Registration due
- 10/Dec/07 Initial Submission presentations
  (Burlingame Meeting)
- 26/May/08 Revised Submission due
- 23/Jun/08 Revised Submission presentations

## BURLINGAME MEETING SCHEDULE (TENTATIVE)

| | |
|---|---|
| Mon. AM | Robotics Steering Committee |
| | Initial Submission presentations |
| Mon. PM | Discussions for Revised Submission |
| Tue. AM | Robotics Plenary |
| Tue. PM | Discussions for Revised Submission |
| Wed. PM | Discussions for Revised Submission |
| Thu. AM | Discussions for Revised Submission |

# TYPICAL CASE SCENARIOS FOR THE ROBOTIC LOCALIZATION SERVICE

2007.9.26

Robotic Localization Service WG
Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio

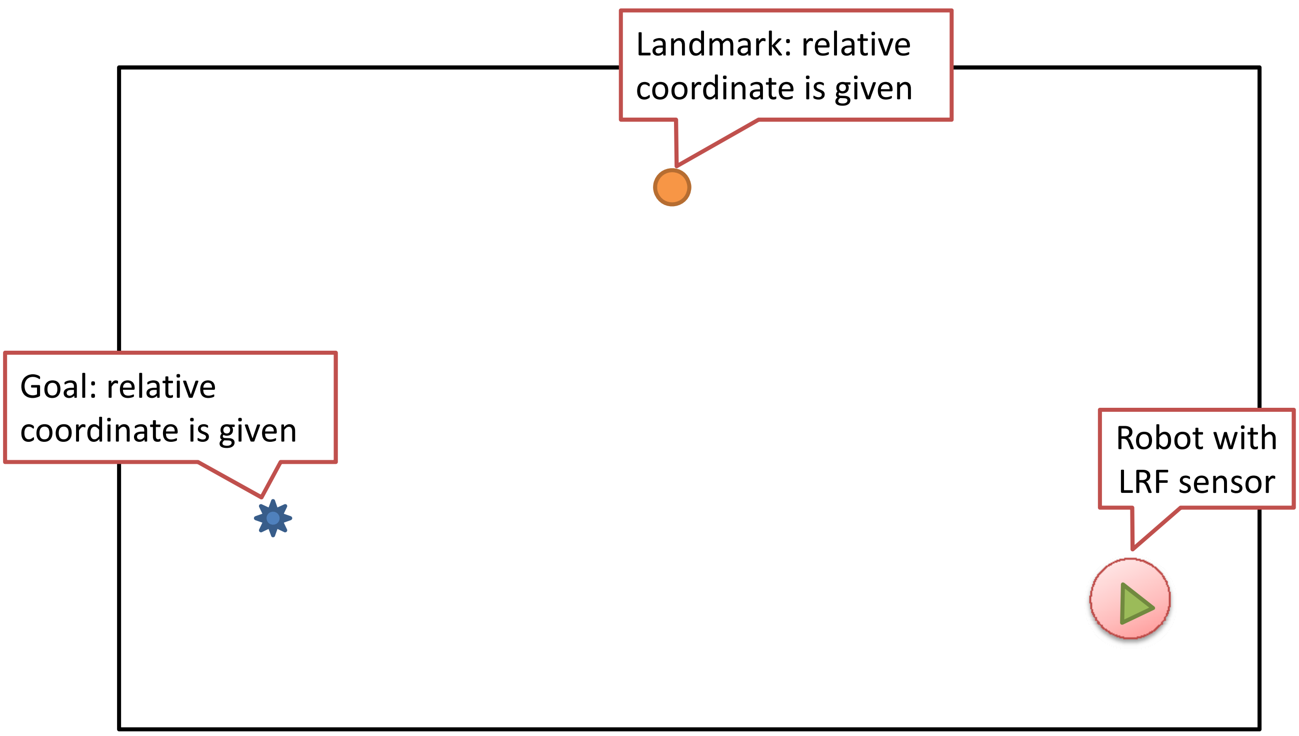
# OVERVIEW OF SCENARIOS

| | Num of Environments | Num of Sensors | Action |
|---|---|---|---|
| Scenario 1 | 1 | 1 | navigation |
| Scenario 2 | 1 | n | navigation |
| Scenario 3 | 2 | n | navigation & manipulation |

# SCENARIO 1

- Environment = Single Environment
- Sensor used = Single sensor
- Sensor installation location = on robot
- Localization hint = landmark
- Robot action = navigation
- Goal position = given spatial coordinate

# SCENARIO 1



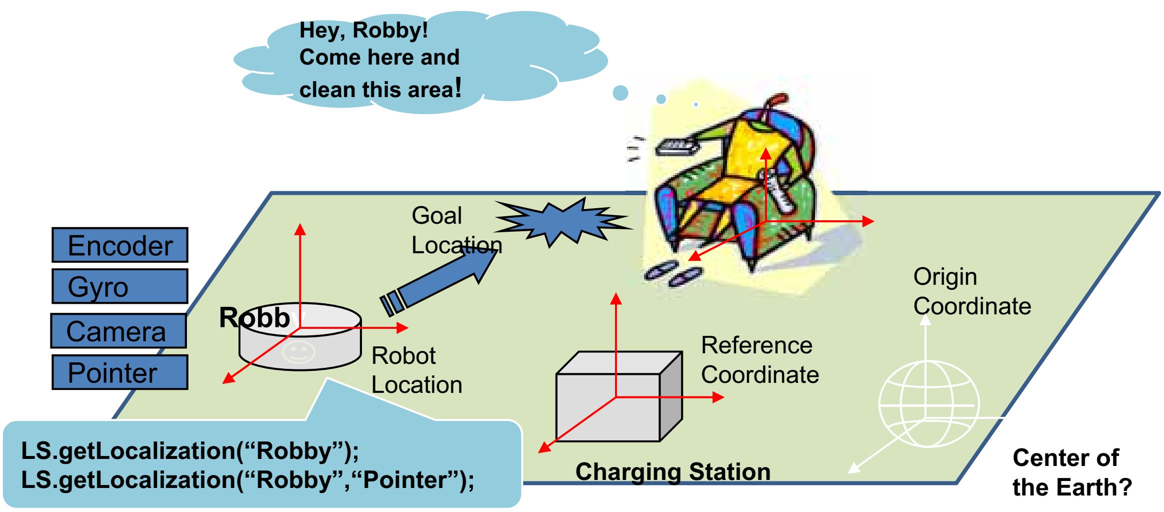
# SCENARIO 2

- Environment = Single Environment
- Sensor used = Multiple sensors
- Sensor installation location

  = on robot & in the environment
- Robot action = navigation
- Goal position = discovered by a sensor

# SCENARIO 2

- Mission
  - A cleaning robot (Robby) can move to goal location assigned by users
  - The Robby can go to charging station whenever it needs.
- Assumptions
  - Encoders and a gyro for the relative position, a camera for the absolute position
  - A pointer sensor which can find the position of the area to be cleaned



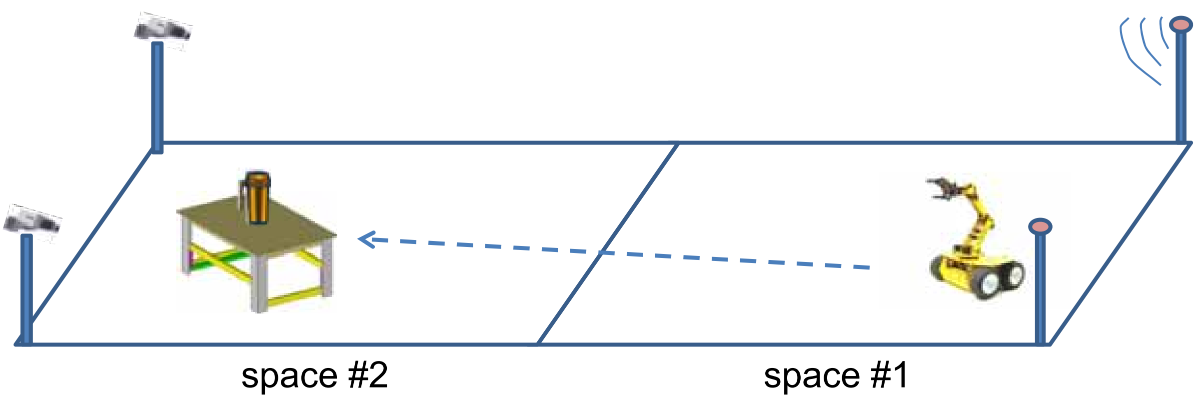
# SCENARIO 3

- Environment = Multiple Environment
- Sensor used = Multiple sensor
- Sensor installation location

  = on robot & in the environment
- Robot action = navigation & manipulation
  - manipulation done by robotic arm with multi-freedom
- Goal position = given approx. position

# SCENARIO 3

- Mission
  - A robot in space #1 moves to a table in space #2
  - And it grips a cup on the table in space #2
- Assumptions
  - No constraints which types of sensor will be used for localization except
    - There are two different distributed sensor networks; one for only space #1 and the other for space #2
  - No barriers between space #1 and space #2
  - Optimal path planning and navigation are done by exterior applications or modules



-OMG Robotics DTF-

- Robotic Functional Services Working Group -

# Meeting Report

## - Jacksonville WG Meeting –

- User Identification RFP draft discussion

Sep 26, 2007

**Co-chairs :** Su Young Chi (chisy@etri.re.kr) / Shuichi NISHIO (nishio@atr.jp)

# Discussion details

- Description for HRI (presented)
- APIs needed to work with the state-of-art HRI technologies (presented)
- Use case and Scenario (presented)
- Differentiation between HRI API and other existing standards (such as BioAPI) (presented)

# Discussion details

- Data format and User ID
- Profile of HRI API
- Focus on the API
- HRI framework and model (Big picture)
- Level of abstraction
- Issue to be discussed
  - User's view vs Developer's view
  - ISO standard study (next meeting)

# Roadmap

| Item | Status | Jacksonville Sep-2007 | Burlingame Dec-2007 | Wash. DC Mar-2008 | Ottawa Jun-2008 | Orlando Sep-2008 | Santa Clara Dec-2008 |
|---|---|---|---|---|---|---|---|
| Localization Service | On-going | | Init. Submission 1st Review | | Revised Submis. | Adaption | |
| User Identification Service(HRI) | On-going | Discussion | Discussion | RFP 1st Draft | RFP 1st Review | RFP 2st Review | RFP 2nd Review / Issue |

# Contact Report of ISO/TC184/SC2

September 26, 2007

Yun Koo Chung(ETRI)



# ISO/TC184/SC2 Contact Report

1. Tokyo Meeting will be held on 26/11/2007 ~ 29/11/2007.

1) Advisory Group 1: Nov. 26 (Mon)
- is to explore needs and new items for standardization in the field of "service robots"
- is to recommend the initiation of new project team
- is to clarify the scope and definitions for PT1 and PT2

2) PT3 (Vocabulary definition, leader): Nov. 27(Tue)
- Is to revise and replace ISO 8373:1994 for "robots and robotic devices"

3) PT2 (Safety for Personal Care Robot): Nov. 28~29
- Current scope : Non-invasive personal care robots (including healthcare)
- 4 Categorization of Personal care robot
  . Surgery and medical robots; Mobile manipulator robots
  . Physical assistance robots; People carrier robots.
- NWIP: 2008 SC2 plenary meeting together with a CD of Part 1

# ISO/TC184/SC2 Contact Report

2. International Robot Exhibition (IREX 2007) in Tokyo, Nov 28 - Dec. 1

. www.nikkan.co.jp/eve/07ROBOT/ENG/
. Industrial robots
. Service robots: health care, entertainment, security/patrol, and building maintenance services…

# Contact Report

Prof. Makoto Mizukawa

mizukawa@sic.shibaura-it.ac.jp

Shibaura Institute of Technology

Tokyo, Japan



# New Offer (24th, June)

- ISO/TC 184/SC 5
  - Architecture, communications and integration frameworks, has drawn our attention to possible overlaps with their work item ISO 20242, Industrial automation systems and integration - Service interface for testing applications, and potentially other SC 5 projects. Also the former robot companion standard ISO 9606 may be relevant to the RAPI proposal.

# ISO/TC 184/SC 5/WG 6

- The next meeting of the working group, responsible for the ISO 20242 standard, will meet in Frankfurt on 1 and 2 October, 2007
- ORiN forum will send a delegation to the SC5 meeting.



# Correspondence from CANopen

Fri, 31 Aug 2007

- I personally think that it might be necessary to start the development for a system specification (application profile or additional specific device profiles for this application domain).

  - Holger Zeltwanger
    CiA Managing Director
  - CAN in Automation (CiA) GmbH

# Coming conferences

- 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (**2007 IROS**) **http://www.iros2007.org/**
- Sheraton Hotel, San Diego, CA, USA
- Oct 29-Nov 2 2007



# Coming conferences cont'd IROS2007 related activities

- October 29 (Mon)
  - Workshops
    - MW-2 Network Robot Systems: Ubiquitous, Cooperative, Interactive Robots for Human Robot Symbiosis
      Norihiro Hagita et.al
    - MW-5 Measures and Procedures for the Evaluation of Robot Architectures and middleware, Erwin Prassler et.al
    - MW-8 Robot Semantic Web Tom Henderson, R. Dillmann et.al
  - Tutorial
    - MT-2 Building Ubiquitous Robot Systems: A Hands-On Tutorial Alessandro Saffiotti, Mathias Broxvall
- November 2(Fri)
  - Workshop
    - FW-2 Ubiquitous Robotic Space Design and Applications
      Wonpil Yu

# Coming conferences cont'd

- 2007 International Conference on Control, Automation and Systems (**ICCAS 2007**) **www.iccas.org**
- the COEX in Seoul, Korea, October 17 - 20, 2007
  - Organized by ICROS(The Institute of Control, Robotics and Systems)
  - Technically Co-sponsored by IEEE IES, RAS and CSS
  - FP02 OS003 RT (Robot Technology) System Integration
  - Chairs
    - Prof. Chung Yun Koo ETRI
    - Prof. Ahn Hyo-Sung Gwangju Institute of Science and Technology
  - 6papers



# Coming conferences cont'd

- **ICCAS 2007**
- FP02 OS003 RT (Robot Technology) System Integration
  - FP02-1 Navigation of the Autonomous Mobile Robot Using Laser Range Finder Based on the Non Quantity Map
    S. Kubota, Y. Ando, M. Mizukawa (S.I.T.)
  - FP02-2 Research on the "Task Localization" for Distributed Intelligence Japan H. Minamino, M. Mizukawa, Y. Ando (S.I.T.)
  - FP02-3 Testing and Certification Framework for URC Korea Sangguk Jung (TTA)
  - FP02-4 Software Testing for Intelligent Robot Korea
    Yun Koo Chung (ETRI)
  - FP02-5 Indoor Mobile Robot and Pedestrian Localization Techniques Korea Hyo-Sung Ahn (Gwangju Institute of Science and Technology), Won Pil Yu( ETRI)
  - FP02-6 Localization of Ubiquitous Environment Based Mobile Robot Japan Yong-Shik Kim, et.al (AIST)

## Result of Flier Voting

24-Sep-07

| | Draft 1 | Draft 2 | Draft 3 |
|---|---|---|---|
| RTI | | 1 | |
| John Deer | | 1 | |
| Mitre | | 1 | |
| ETSII | | | 1 |
| Samsung | | 1 | |
| Shibaura IT | | 1 | |
| Hitachi | | 1 | |
| NEDO | | | 1 |
| Toshiba | | 1 | |
| | | | |
| Total | | 7 | 2 |

# Robotics-DTF Plenary Meeting Closing Session

September 26, 2007

Jacksonville, FL, U.S.A.

Hyatt Regency Jacksonville Riverfront





# Document Number

robotics/2007-09-01 Final Agenda (Tetsuo Kotoku)
robotics/2007-09-02 Brussels Meeting Minutes [approved] (Yun-Koo Chung and Fumio Ozaki)
robotics/2007-09-03 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2007-09-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2007-09-05 Introduction to HriAPI RFP (Su-Young Chi)
robotics/2007-09-06 A quick view of Robotic Localization Service Proposal (Kyuseo Han)
robotics/2007-09-07 User Identification for HRI (Su-Young Chi)
robotics/2007-09-08 Robotic Localization Service Proposal Overview (draft, in Progress) (Shuichi Nishio)
robotics/2007-09-09 Typical Examples from Tsubouchi (Takashi Tsubouchi)
robotics/2007-09-10 Senarios for Comparison of Proposals (Kyuseo Han)
robotics/2007-09-11 Opening Presentation (Tetsuo Kotoku)

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robotics/2007-09-10 Senarios for Comparison of Proposals (Kyuseo Han)
robotics/2007-09-11 Opening Presentation (Tetsuo Kotoku)
robotics/2007-09-12 Robotic Localization Services WG Status Report (Kyseo Han, Yeon-Ho Kim and Shuichi Nishio)
robotics/2007-09-13 Typical Case Scenarios for the Robotic Localization Service (Kyseo Han, Yeon-Ho Kim and Shuichi Nishio)
robotics/2007-09-14 Robotic Functional Services WG Report (Su-Young Chi)
robotics/2007-09-15 ISO TC184 SC2 Contact Report (Yun-Koo Chung)
robotics/2007-09-16 Contact Report (Makoto Mizukawa)
robotics/2007-09-17 Result of Flier Voting (Yun-Koo Chung)
robotics/2007-09-18 Closing Presentation (Tetsuo Kotoku)
robotics/2007-09-19 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2007-09-20 DTC Report Presentation (Tetsuo Kotoku)
robotics/2007-09-21 Jacksonville Meeting Minutes - DRAFT (Shuichi Nishio and Su-Young Chi)





# Robotics-DTF leaflet

**Plan 1**

**Plan 2**

**Plan 3**

**Plan 2 is adopted as 1st version**
**The picture and figure will be replaced by proper ones**
**Samsung is added to the member list**

# Changes in volunteers

## Resignation

- Hung Pham (RTI) [ job change ]
- Saehwa Kim (SNU) [ job change ]
- Seung-Ik Lee(ETRI) [ team policy change ]

## New Volunteer

- Robotic Localization Services WG
  - Kyuseo Han (ETRI)
  - Yeon-Ho Kim (Samsung)
  - Shuichi Nishio (JARA/ATR)
- Robotic Functional Services WG
  - Hyunsoo Kim (Samsung)



AIST

# Organization

- **Robotics-DTF** — Yun-Koo Chung (ETRI, Korea); Tetsuo Kotoku (AIST, Japan)
  - **Steering Committee** — All volunteers
    - **Publicity Sub-Committee** — Abheek Bose (ADA Software, India); Masayoshi Yokomachi (NEDO, Japan); Yun-Koo Chung (ETRI, Korea)
    - **Contacts Sub-Committee** — Makoto Mizukawa (Shibaura-IT, Japan); Yun-Koo Chung (ETRI, Korea)
  - *Technical WGs*
    - **Infrastructure WG** — Noriaki Ando（AIST, Japan); Rick Warren (RTI, USA)
    - **Robotic Functional Services WG** — Soo-Young Chi (ETRI, Korea); Shuichi Nishio (JARA/ATR, Japan); Hyunsoo Kim (Samsung, Korea)
    - **Robotic Data and Profiles WG** — Bruce Boyes (Systronix, USA)
    - **Robotic Localization Services WG** — Kyuseo Han (ETRI, Korea); Yeon-Ho Kim (Samsung, Korea); Shuichi Nishio (JARA/ATR, Japan)

NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

# Call for volunteer

- Additional Robotics-DTF Co-chair
- Not  from Japan and Korea
- Election will be held upcoming Burlingame Technical Meeting





# Special Talk Candidates

- Introduction to Robotic Technology Component Specification and some potential RFPs (Tentative)
  - Noriaki Ando, Takeshi Sakamoto and (Rick Warren?)
- Report of RoboDevelopment 2007 and Introduction to JCX robotics project (Tentative)
  - Bruce Boyes (Systronix)
- Someone from local area

NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

# Next Meeting Agenda

December 10-14 (Burlingame, CA, USA)

**Monday:**

**Steering Committee** (morning)
**RLS Initial Submission Presentations** (am)
**WG activity** (pm)

**Tuesday:**

**WG activity** (am)
**Robotics-DTF Plenary Meeting** (pm)
- Guest and Member Presentation
- Contact reports
- Co-chair election

**Wednesday-Thursday:**

**WG activity follow-up** [if necessary]

OMG Technical Meeting - **Burlingame, CA, USA** -- Dec. 10-14 , 2007

| | | TF/SIG | | http://robotics.omg.org/ | | |
|---|---|---|---|---|---|---|
| | | **Host** | **Joint (Invited)** | **Agenda Item** | **Purpose** | **Room** |
| **Monday: Robotics Plenary(am) and WG activites(pm)** | | | | | | |
| 8:00 | 8:45 | Robotics | | Robotics Steering Committee | Arrangement | |
| 8:45 | 9:00 | Robotics | | Robotics-DTF Plenary Opening Session | Robotics plenary openning | |
| 9:00 | 10:00 | | | Robotic Localization Service - Initial Submission Presentation (1)<br>- Shuich Nishio (JARA/ATR) | presentation and discussion | |
| 10:00 | 11:00 | | | Robotic Localization Service - Initial Submission Presentation (2)<br>- Kyuseo Han (ETRI) | presentation and discussion | |
| 11:00 | 12:00 | | | Robotic Localization Service - Initial Submission Presentation (3)<br>- Yeon Ho Kim (Samsung) | presentation and discussion | |
| 12:00 | 13:00 | **LUNCH** | | | | |
| 13:00 | 18:00 | | | Architecture Board Plenary | | |
| 13:00 | 18:00 | Robotics | | Robotic Localization Services WG (5h)<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | |
| | | | | Services WG(5h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | |
| **Tuesday: WG activities (am) and Robotics Plenary (pm)** | | | | | | |
| 9:00 | 11:00 | Robo ics | | Robotic Localization Services WG (2h)<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | |
| | | | | Services WG(2h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | |
| 11:00 | 12:00 | | | Robotic Data and Profiles WG(1h):<br>- Bruce Boyes | discussion | |
| 12:00 | 13:00 | **LUNCH** | | | | |
| 13:00 | 14:00 | Robotics | | WG Reports and Roadmap Discussion<br>(Service WG, Profile WG, Robotic Localization Services WG) | reporting and discussion | |
| 14:00 | 15:00 | Robotics | | **Special Talk: Introduction to Robotc Technology Component Specification and some potential RFPs (Tentative)<br>- Noriaki Ando, Takeshi Sakamoto and (Rick Warren?)** | presentation and discussion | |
| | | | | **Break (30min)** | | |
| 15:30 | 16:30 | Robotics | | **Special Talk: Report of RoboDevelopment 2007 and Introduction to JCX Robotics Project (Tentative)<br>- Bruce Boyes (Systronix)** | presentation and discussion | |
| 16:30 | 17:10 | Robotics | | Contact Reports:<br>- Makoto Mizukawa(Shibaura-IT), and Yun-Koo Chung(ETRI) | Information Exchange | |
| 17:10 | 17:30 | Robotics | | **DTF Co-Chair election** and Next meeting Agenda Discussion | Robotics plenary closing | |
| 17:30 | | | | Adjourn joint plenary mee ing | | |
| 17:30 | 18:00 | Robotics | | Robotics WG Co-chairs Planning Session<br>(Agenda for Jacksonville, Draft report for Friday | planning for next meeting | |
| **Wednesday WG activity follow-up** | | | | | | |
| 9:00 | 12:00 | Robotics | | Robotic Localization Services WG (3h)<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | |
| | | | | Services WG(3h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | |
| 12:00 | 14:00 | **LUNCH and OMG Plenary** | | | | |
| 14:00 | 18:00 | Robotics | | Robotic Localization Services WG (3h)<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | |
| | | | | Services WG(3h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | |
| 18:00 | 20:00 | **OMG Reception** | | | | |
| **Thursday** | | | | | | |
| 9:00 | 12:00 | Robotics | | Robotic Localization Services WG (3h)<br>- Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio | discussion | |
| | | | | Services WG(3h): Human Robot Interaction RFP draft Mee ing<br>- Su-Young Chi | discussion | |
| 12:00 | 13:00 | **LUNCH** | | | | |
| 13:00 | 18:00 | | | Architecture Board Plenary | | |
| **Friday** | | | | | | |
| 8:30 | 12:00 | | | AB, DTC, PTC | | |
| 12:00 | 13:00 | **LUNCH** | | | | |
| **Other Meetings of Interest** | | | | | | |
| **Monday** | | | | | | |
| 8:00 | 8:45 | OMG | | New Attendee Orienta ion | | |
| 18:00 | 19:00 | OMG | | New Attendee Reception (by invitation only) | | |

# Robotics-DTF

Date: Friday, 28th September, 2007
Chair: Tetsuo Kotoku and YunKoo Chung
Group URL: http://robotics.omg.org/
Group email: robotics@omg.org

## ➢Highlights from this Meeting:

**Robotics Plenary:** (11 participants)

- 2 WG Reports [robotics/2007-09-12,14]
- 2 Contact Reports [robotics/2007-09-15,16]
- Publicity SC Report [robotics/2007-09-17]
- Preliminary Agenda for Burlingame [robotics/2007-09-19]

# Robotics-DTF

Date: Friday, 28th September, 2007
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## ➢Deliverables from this Meeting:

- Typical case scenarios for the Robotic Localization Service [robotics/2007-09-13]

## ➢Future deliverables (In-Process):

- Robot-Human Interaction RFP

## ➢Next Meeting (Burlingame, CA , USA):

- Initial Submission Presentation of Robotic Localization Service RFP
- Robot-Human Interaction RFP discussion
- Guest presentations
- Roadmap discussion
- Contact reports
- Robotics-DTF Co-chair election

**Minutes of the Robotics-DTF Meeting --- DRAFT**
**September 26, 2007, Jacksonville, FL, USA**
robotics/2007-09-21

## Minutes Highlights

- The final report of Robotic Technology Component (RTC) FTF was approved in AB and recommended in PTC. [ptc/2007-08-17]
- Several scenarios to evaluate proposals of the Robotic Localization Service RFP was discussed. [robotics/2007-09-13]
- The Human-Robot Interaction Service was under discussion as a potential RFP. [robotics/2007-09-14]
- Robotic Localization Service WG was set up for making a revised proposal of Robotic Localization Service RFP.
- Additional DTF Co-Chair election was announced.

## List of Generated Documents

robotics/2007-09-01 Final Agenda (Tetsuo Kotoku)
robotics/2007-09-02 Brussels Meeting Minutes [approved] (Yun-Koo Chung and Fumio Ozaki)
robotics/2007-09-03 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2007-09-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2007-09-05 Introduction to HriAPI RFP (Su-Young Chi)
robotics/2007-09-06 A quick view of Robotic Localization Service Proposal (Kyuseo Han)
robotics/2007-09-07 User Identification for HRI (Su-Young Chi)
robotics/2007-09-08 Robotic Localization Service Proposal Overview (draft, in Progress) (Shuichi Nishio)
robotics/2007-09-09 Typical Examples from Tsubouchi (Takashi Tsubouchi)
robotics/2007-09-10 Scenarios for Comparison of Proposals (Kyuseo Han)
robotics/2007-09-11 Opening Presentation (Tetsuo Kotoku)
robotics/2007-09-12 Robotic Localization Services WG Status Report (Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio)
robotics/2007-09-13 Typical Case Scenarios for the Robotic Localization Service (Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio)
robotics/2007-09-14 Robotic Functional Services WG Report (Su-Young Chi)
robotics/2007-09-15 ISO TC184 SC2 Contact Report (Yun-Koo Chung)
robotics/2007-09-16 Contact Report (Makoto Mizukawa)
robotics/2007-09-17 Result of Flier Voting (Yun-Koo Chung)
robotics/2007-09-18 Closing Presentation (Tetsuo Kotoku)
robotics/2007-09-19 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2007-09-20 DTC Report Presentation (Tetsuo Kotoku)
robotics/2007-09-21 Jacksonville Meeting Minutes - DRAFT (Shuichi Nishio and Su-Young Chi)

## Minutes

September 26th, 2007 Wednesday, City Terrace 5, 3rd floor

**09:00-09:00 Plenary Opening [**robotics/2007-09-11]
- Approval of the Brussels Minutes
  .Brussels Minutes (Dr. Chung and Dr. Ozaki) [robotics/2007-09-02]
  .European peoples and IEEE people interested in OMG standardization activation
  .AIST (motion), Shibaura-IT (second), Tech. Arts (white ballot)
  .motion passed

- Jacksonville Meeting: Quorum: 5
  .joined organizations: AIST/ETRI/JARA/Samsung/Shibaura-IT/Technologic Arts
  .proxy: NEDO

- Minutes takers : Dr. Nishio and Dr. Chi

**09:10-10:00 WG reports and Roadmap Discussion**
** Robotic Localization Service WG (Dr. Nishio) [robotics/2007-09-12, -13]
- discussion summary
- 3 sample scenarios for comparing submissions
- next meeting schedule

** Robotic Functional Services WG (Dr. Chi) [robotics/2007-09-14]
- HRI Draft RFP
  - discussion summary
  - Issues to be discussed (on next meeting)
    - user's view vs developer's view
    - ISO standard study
  - Roadmap
    - Burlingame: discussion
    - Washington: RFP 1st draft
    - Ottawa: 2nd draft
    - Orlando: 1st review
    - Santa Clara: 2nd review / issue

** Robotics-DTF Roadmap (Dr. Kotoku) [robotics/2007-09-04]
- Dr. Kotoku suggest to change schedule for the HRI RFP
  - omit the 2nd draft in Ottawa;
  - 1st review in Ottawa, 2nd in Orlando

**10:00-10:20 Contact Reports**
** ISO/TC184/SC2 Contact Report (Dr. Chung) [robotics/2007-09-15]
- no activity after Brussels meeting
- next SC2 meeting held in Tokyo, Japan, 26/11/07-29/11/07
- advisory group (Mon):
- explore needs and new items for stand. in 'service robots'
- PT3(Tue): newly started
- revise ISO 8373:1994 "robots and robotic devices"
- original: industrial, add definitions for service robots
- PT2(Wed-Thu) Safety for Personal Care Robot
- International Robot Exhibition (IREX2007) in Tokyo, 28/11/07-01/12/07
- main focus on industrial robot

** ISO/TC 184 (Prof. Mizukawa) [robotics/2007-09-16]
- SC5/WG6 Oct 1,2 (Frankfurt)

- correspondence from CANopen (31/Aug)
- start development for a system specification
- application profile or additional specific device profiles ( for robots)
- chance to cope with them
- upcoming conferences
  .IROS (29/Oct-2/Nov, San Diego)
  .ICCAS 2007 (17-20/Oct, Seoul)

**10:20-10:30 HRI focus discussion** (Dr. Kim; no presentation)
- short explanation on topics to be discussed on HRI-RFP at next meeting
- topics to be discussed
  - UI(user identification) component
  - output = user ID
  - input = speech/image?
  - capture/process/match steps inside the component
  - UI standardize contains developer view and inner module API comments:
- Normally, the word 'HRI' means focus on interaction; 'interaction' people are more interested in the output (user ID, etc.) of the component, not what's happening inside the component. (Dr. Nishio)
- Our main focus is on the inside of the component, such as face recognition or speech recognition, and not on the output. (Dr. Kim)
- As for the output, not only ID but gender, or other attributes might as well be concerned. (Dr. Nishio)
- It is still impossible to clarify the necessary output items. This is still under research. Thus, we want to start by limiting functionalities, in a specific area. (Dr. Kim)
- The state-of-out for the facial/speech recognition for robotics, still seems immature. That seems to be the difference with the Localization RFP (Prof. Tsubouchi)
- Still, making the API standard will be helpful. (Dr. Kim)
- In Korea, speaker/face recognition, user identification API, in URC (networked robot) environment is standardized. (Dr. Kim)
- Is there any related RFI, related this item? (Prof. Tsubouchi)
- There is a summary of RFI report by Olivier. Person Recognition and Human Interface are one of the topics.
- If you need, new RFI can be issued. (Dr. Kotoku)
- We should concern the relationship with the Profile WG (Dr. Tsubouchi)
- Dr. Chi is thinking of this (Dr. Kim)

**10:30-11:00 Publicity Sub-Committee Report** (Dr. Chung) [robotics/2007-09-17]
- flier voting result
  .9 votes
  .draft 2 selected (the blue one)
- the front photograph doesn't look like a robot
  .change photograph
- in Nov., the final version will be sent out
  .substitute photo will be sent in the next couple of weeks
- information day
  .targeted on Ottawa meeting

**11:00-11:30 Plenary Closing** (Dr. Kotoku) [robotics/2007-09-18]
- volunteer changes
  - Dr. Pham , Dr, Kim and Dr. Lee resigned
  - Setup new Robotic Localization Service WG (mission oriented WG)
    -Co-Chair: Dr. Yeon-Ho Kim (Samsung), Mr. Kyuseo Han (ETRI), Dr. Shuichi Nishio (JARA/ATR)
    * AIST (motion) ETRI (second) Shibaura-IT (white ballot)
    - motion passed
  - Dr. Hyunsoo Kim (Samsung) newly joined as Robotic Functional Services WG co-chair
    * ETRI (motion) Shibaura-IT (second) Tech. Arts (white ballot)
    - motion passed
- call for volunteer
  - additional volunteer of the Robotics-DTF co-chair

- Co-Chair election will be held in Burlingame

- next meeting
  - Mon: (AM) steering committee / RLS initial submission presentations
  - Tue: (PM) Robotics-DTF plenary
  - HRI RFP discussion Monday to Thursday

**11:30 Adjourn plenary meeting**

## Plenary Meeting Attendee (Sigh-in): 11

- Hyun-Soo Kim (Samsung)
- Kyuseo Han (ETRI)
- Makoto Mizukawa(S.I.T.)
- Noriaki Ando (AIST)
- Shuichi Nishio (JARA/ATR)
- Su-Young Chi (ETRI)
- Takashi Tsubouchi (Tsukuba Univ.)
- Takeshi Sakamoto (Technologic Arts)
- Tetsuo Kotoku (AIST)
- Toshio Hori (AIST)
- Yun-Koo Chung (ETRI)

Prepared and submitted by Su-Young Chi (ETRI) and Shuichi Nishio (JARA/ATR)